FLORA

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THE

FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. III.

CAPRIFOLIACEÆ TO APOCYNACEÆ.

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FLORA OF BRITISH INDIA.

Order LXXIV. **CAPRIFOLIACEÆ.** (By C. B. Clarke.)

Shrubs, erect or scandent, or small trees (*Adoxa*, a herb), branches round. *Leaves* opposite, rarely 3-nate; stipulate or not. *Flowers* hermaphrodite, cymose or panicled, capitate in *Adoxa*, regular or irregular. *Calyx-tube* adnate to the ovary; limb 3–5-toothed or -lobed. *Corolla* gamopetalous; limb often 2-lipped, 5-lobed, lobes imbricate in bud. *Stamens* 5 (in *Adoxa* 8–12), on the corolla alternate with its lobes. *Ovary* inferior (in *Adoxa* ½-inferior), 2–8-rarely 1-celled; style long, with capitate stigma, or short, 2–5-lobed; ovules solitary, pendulous, or several on axile placentas. *Fruit* a drupe (in *Abelia* dry), with 1–8 cartilaginous pyrenes, or a many-seeded berry. *Seeds* 1 or many in each cell, albumen copious fleshy; embryo usually minute.—Species 200; mostly Northern, with a few Australian and S. American.

Distinguished from *Rubiaceæ* chiefly by habit and the frequently irregular flowers and rarity of stipules.

Tribe I. **Sambuceæ.** *Corolla-limb* regular. *Style* short, 2–5-lobed. *Ovary-cells* 1-ovuled.

Leaves 2-ternatisect. Flowers capitate. Stamens 8–12 . . . . 1. Adoxa.
Leaves pinnate; leaflets 5–9, serrate . . . . 2. Sambucus.
Leaves undivided . . . . 3. Viburnum.

Tribe II. **Lonicereæ.** *Corolla-limb* regular or irregular. *Style* long; stigma capitate.

Leaves sessile, connate, obovate. Ovary-cells 3, 1-ovuled . . . 4. Triosteum.
Calyx-lobes elongate. Fruit elongate, coriaceous, 1-seeded . . . 5. Abelia.
Leaves entire. Flowers paired. Berry 2–3-celled . . . . 6. Lonicera.
Leaves exstipulate. Branches fistular. Ovary 5–8-celled . . . 7. Leycesteria.
Leaves stipulate. Branches solid. Ovary 5-celled . . . . . . 8. Pentapyxis.

1. **ADOXA,** *Linn.*

A small glabrous succulent herb. *Radical* leaves long-petioled, 3-ternatisect; cauline 3-fid. *Flowers* small, green, in a peduncled head. *Calyx-tube* hemispheric; limb ½-superior, 2–4-lobed. *Corolla* rotate, 4–6-lobed. *Stamens* 8–12, in pairs alternating with the corolla lobes; anther-cells 2, confluent above. *Ovary* 3–5-celled; styles 3–5; ovules 1 in each cell. *Drupe* subglobose; pyrenes 4–5, compressed. *Seeds* obovate, flattened.

A genus differing much from the order in habit. Perhaps nearer *Chrysosplenium*.

1. **A. Moschatellina,** *Linn.*; *Boiss. Fl. Orient.* iii. 2.

VAR. *inodora,* Falc. mss.; inodorous, cauline leaf often solitary, flowers 5–6-merous.

KASHMIR, *Falconer*; Pir Pinjal, alt. 11,500 ft., *C. B. C.*—DISTRIB. N. Europe, Asia, and America.

Rootstock short, creeping. *Stem* simple, 3–6 in., terminating in a solitary peduncle. *Radical leaves* $\frac{1}{2}$–2 in. diam., with a long 2–6 in. petiole; cauline 2 in European, often 1 in Kashmir specimens, smaller, petiole short or 0; segments obtuse or mucronate. *Heads* $\frac{1}{2}$ in. diam., green, in European specimens with a terminal 4-merous and 4 lateral 5-merous flowers; in Kashmir with a terminal 5-merous and 4 or more lateral 6-merous ones. *Drupe* $\frac{1}{6}$ in. diam.; endocarp and seeds flattened.—Odour of the European plants musky, of Kashmir 0, on which account and the 5–6-merous flowers Falconer regarded the latter as a distinct species (*A. inodora*, Falc.), but its habit and all other characters are identical with the European.

2. SAMBUCUS, *Linn.*

Shrubs or small trees. *Leaves* unequally pinnate, large, often stipulate; leaflets serrate or laciniate. *Corymbs* large, very compound, bracteate; flowers small, jointed with the pedicel, very rarely bracteolate. *Calyx-limb* 3–5-toothed. *Corolla* rotate or campanulate, 3–5-partite. *Stamens* 5, attached to the base of the corolla. *Ovary* 3–5-celled; style short, 3–5-partite, or stigmas 3–5-sessile; ovules 1 in each cell, pendulous. *Drupe* crowned by the calyx-teeth, 3–5-celled. *Seeds* compressed; embryo long.—DISTRIB. Species 10–12, in all temperate regions (except S. Africa).

1. **S. Ebulus,** *Linn.*; herbaceous, leaflets free, stipules often foliaceous serrate, drupes black. *H. f. & T. in Journ. Linn. Soc.* ii. 179; *Brandis For. Fl.* 260; *Boiss. Fl. Orient.* iii. 2.

KASHMIR; alt. 6000–10,000 ft., plentiful; *T. Thomson*, &c.—DISTRIB. Europe, N. Africa, and to the Elburz Mts.

Gregarious; stems mostly simple, 3–6 ft. high. *Leaves* 9 in.; leaflets 5–9, oblong-lanceolate, 3–6 in., puberulous or nearly glabrous. *Corymb* peduncled or leafy at the base, compact and 3-rayed in English, usually larger and many-rayed in Kashmir specimens; bracteoles minute, linear. *Corolla* $\frac{1}{6}$ in. diam., broadly campanulate, white pink or dark purple. *Drupe* $\frac{1}{6}$ in. diam., globose.—Flowers with a strong peculiar odour, both in Kashmir and Europe, uppermost usually barren.

2. **S. javanica,** *Blume Bijd.* 657; a straggling shrub, leaflets free, stipules usually small or 0, drupes black. *DC. Prodr.* iv. 322; *Miq. Fl. Ind. Bat.* ii. 124; *H. f. & T. in Journ. Linn. Soc.* ii. 180. S. Wightianus, *Wall. Cat.* 6303; *W. & A. Prodr.* 388. S. rubra, *Ham.*; *Wall. Cat.* 482. S. chinensis, *Lindl. in Trans. Hort. Soc. Lond.* vi. 297; *DC. l.c.* S. Thunbergiana, *Miq. in Ann. Mus. Lugd. Bat.* ii. 265; *Kurz For. Fl.* ii. 3. Sambucus sp., *Griff. Notul.* iv. 259.

ASSAM and EAST BENGAL PLAIN; ascending in KHASIA to 5000 ft. alt., in SIKKIM to 6000.—DISTRIB. Java, China, Japan.

Leaves 18 in., of 5–9 oblong-lanceolate leaflets 3–8 in., puberulous or nearly glabrous. *Corymb* usually leafy at the base, often 1 ft. diam., puberulous or almost villous; bracteoles minute, ovate. *Corolla* $\frac{1}{6}$ in. diam., broadly campanulate, white or pink. *Berry* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., globose.—Uppermost flowers usually barren; female

apetalous in the cultivated *S. chinensis* (*Lindley*), but not usually so in the wild plant. The Khasia examples have the fruits mostly sessile, agreeing thus more closely with *S. chinensis* than with *S. javanica*, in which the fruits are usually shortly pedicelled.

3. **S. adnata,** *Wall. Cat.* 482; a spreading shrub, leaflets often decurrent, stipules usually small or 0, drupes red. *DC. Prodr.* iv. 322; *H. f. & T. in Journ. Linn. Soc.* ii. 180.

NIPAL, *Wallich*; Tambur Valley, alt. 5000–10,000 ft., *J. D. H.* SIKKIM; Singalelah, alt. 10,000 ft., *Gamble, C. B. C.*

A shrub, 4–8 ft. *Leaves* 12 in.; leaflets 5–9, 3–5 in., oblong-lanceolate, puberulous or nearly glabrous. *Corymb* usually leafy at the base, often 9 in. diam., puberulous, bracteoles minute or 0. *Corolla* $\frac{1}{6}$ in. diam., broad-campanulate. *Drupes* $\frac{1}{6}$ in. diam., globose.

3. VIBURNUM, *Linn.*

Shrubs or small trees. *Leaves* opposite, rarely 3-nate; stipules inconspicuous (in the Indian species). *Flowers* in terminal or subterminal corymbose or panicled cymes, all fertile in Indian (outer radiant and neuter in some European, &c., species). *Calyx-tube* turbinate or subcylindric; limb short, 5-toothed, persistent. *Corolla* campanulate rotate or tubular; lobes 5, equal. *Stamens* 5, inserted on the corolla-tube. *Ovary* 1–3-celled; style short, stigma sub-3-lobed; ovules 1 in each cell, pendulous. *Drupe* 1- or sub-2-3-celled, 1-seeded. *Seed* oblong, compressed, concave on the ventral face or with the margins greatly incurved; albumen fleshy, uniform or ruminated; embryo minute.—DISTRIB. Species 80, in N. temperate regions and in the Andes; a few in the West Indies and Madagascar.

SECT. I. **Eu-Viburnum** (*Oersted*). *Cymes* corymbose. *Drupe* 1-celled, compressed; endocarp not intruded. *Albumen* uniform, margins little incurved.

* *Corolla rotate or shortly campanulate, lobes spreading* (in *V. corylifolium* unknown).

1. **V. cotinifolium,** *Don Prodr.* 141; leaves ovate or elliptic base obtuse usually woolly beneath, corymb-branches stellately tomentose, calyx glabrous limb very short, corolla shortly campanulate lobes about as long as the tube. *DC. Prodr.* iv. 327; *Wight Ill.* t. 121, A fig. 1–5; *Bot. Reg.* t. 1650; *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Brandis For. Fl.* 258. V. polycarpum, *Wall. Cat.* 455; *DC. l.c.* 328.

KASHMIR; alt. 6000–11,000 ft., to KUMAON, frequent. EAST BHOTAN; *Griffith* (Kew Distrib. No. 3399).

A spreading shrub, 5–10 ft. high. *Leaves* 3 by 2 in., obtuse or subacute, subentire rarely coarsely crenate, stellately-woolly at least when young, in age often glabrous except on the nerves beneath; petiole $\frac{1}{4}$ in. *Corymbs* 2–3 in. diam., generally terminal, dense, branches stout; bracteoles linear, equalling the calyx-tube. *Corolla-tube* $\frac{1}{8}$ by $\frac{1}{10}$ in., glabrous, lobes round. *Anthers* large, subexsert. *Style* very short, conical. *Drupe* $\frac{1}{4}$ by $\frac{1}{5}$ in., compressed, broad-oblong, red. *Seed* dorsally 2-grooved, ventrally sub-concave 3-grooved.—Leaves usually thick, reticulately rugose and entire, but sometimes thin, glabrous, and somewhat strongly crenate. *V. Lantana*, *Linn.*, differs but slightly by the denticulate leaves and shorter corolla-tube.

2. **V. corylifolium,** *H. f. & T. in Journ. Linn. Soc.* ii. 174; branchlets and large fruiting corymb rufous-hirsute, leaves ovate or elliptic base subcordate, softly hairy beneath.

KHASIA MTS., alt. 5-6000 ft.; Moleem, *Griffith* (Kew Distrib. No. 3402); Kala-Pani, *H. f. & T.*: Moflong, *C. B. C.*

Leaves 2½ by 1½ in., acute, dentate, parallel-nerved. *Corymbs* often on short lateral branches. *Flowers* not seen. *Drupe* ¼ by ⅕ in., compressed, ovate-oblong, bright red; seed dorsally convex shallowly 2-grooved, ventrally concave and 2-grooved close to the medial line.

3. **V. stellulatum,** *Wall. Pl. As. Rar.* ii. 54, t. 169; *Cat.* 463; leaves shortly petioled elliptic-lanceolate acuminate toothed stellately pubescent rarely glabrate beneath, corolla small rotate. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Brandis For. Fl.* 258. V. Mullaha, *Ham.*; *Don Prodr.* 141; *DC. l. c.*

TEMPERATE HIMALAYA, alt. 6000–11,000 ft.; from KASHMIR to SIKKIM, common.

A large shrub: branches puberulous. *Leaves* 3 by 1½ in., base obtuse or cuneate, parallel-veined; petiole ½ in. *Corymbs* terminal, in fruit divaricate, 3–5 in. diam., subglobose; bracts ⅕ in., linear, membranous, caducous. *Calyx-tube* stellately hairy; lobes minute, ovate. *Corolla-lobes* $\frac{1}{16}$ in., round, pubescent in bud. *Style* short, stigma capitate. *Drupe* ¼ by ⅕ in., compressed, broadly oblong, yellow-red; seed 2-grooved on both faces, hardly concave ventrally.

VAR. 1. *involucrata*, Wall. Cat. 458 (sp.); branchlets and leaves rufous-villous, corymbs densely villous, bracts lanceolate herbaceous persistent.—Nipal, *Wallich*; Kumaon, *Edgeworth*,—*V. forma monstrosa*, *H. f. & T. l. c.* 175.

VAR. 2. *glabrescens*; corymbs with a few scattered hairs, leaves glabrescent except on the nerves beneath, bracts caducous?—V. involucratum, *H. f. & T. l. c.*

4. **V. Griffithianum,** *C. B. Clarke*; leaves short-petioled elliptic or subobovate acute toothed villous beneath, corymbs densely villous umbellately 4–7-rayed, calyx-tube glabrous, corolla very small rotate. V. fœtidum, var. Griffithianum, *Kurz in Journ. As. Soc.* 1877, pt. ii. 121. V. fœtidum, var. grandifolium, *Kurz For. Fl.* ii. 2. Viburnum sp., *Griff. Notul.* iv. 259; *Ic. Pl. Asiat.* t. 480, *fig.* 1.

EAST ASSAM; banks of the Kamyoon in the Naga country, *Griffith* (*Kew Distrib.* 3403).

Branchlets stout, fuscous villous. *Leaves* 4½ by 2 in., often unequal-sided, base obtusely cuneate, nerves parallel, the lowest not uniting nor quite reaching the base of the leaf; petiole ⅙ in. *Corymbs* terminal, peduncled, 1–3 in. diam., dense even in young fruit; bracts 0, or few, lanceolate, ⅓ in. *Calyx-tube* glabrous, viscid and black in the young fruit; teeth broad-oblong. *Corolla*-lobes $\frac{1}{16}$ in., round.—More nearly allied to *V. stellulatum* than to *V. fœtidum*.

5. **V. fœtidum,** *Wall. Pl. As. Rar.* i. 49, t. 61; *Cat.* 466; leaves oblong-rhomboid 3-nerved at the base remotely toothed nerves beneath stellately pubescent, corymbs subumbellate stellate-pubescent, calyx-tube glabrous. *DC. Prodr.* iv. 325; *H. f. & T. in. Journ. Linn. Soc.* ii. 175; *Kurz For. Fl.* ii. 2.

KHASIA MTS. and ASSAM, alt. 3000–5000 ft., common.—DISTRIB. North Birma.

An erect shrub, 6–10 ft.; branchlets stellate-hairy. *Leaves* 2½ by 1¼ in., scarcely acuminate, base cuneate or rounded, axils of the primary nerves with tufts of hair, secondary transverse conspicuous beneath; petiole ⅛ in. *Corymbs* terminal, 2–4 in. diam., 4–8-rayed, peduncled; bracts and bracteoles from linear-oblong to spathulate-oblong, hairy. *Calyx-teeth* minute, triangular. *Corolla*-lobes $\frac{1}{16}$ in. diam., round, white. *Drupe* ⅕ by ⅙ in., compressed, subacute, red. *Seed* dorsally 2-grooved, ventrally 3-grooved and hardly concave.—Specimens of this in Herb. Griffith. are ticketed as from Darjeeling, whither he sent a collector; but the collections from thence were so mixed with others that no confidence is to be placed in their habitats.

VAR. *premnacea*, Wall. Cat. 461 (sp.); bracts at the base of the umbel large leaf-

like sometimes 1½ in. long. *DC. Prodr.* iv. 325.—Khasia Mts. and Birma.—Hardly distinguishable as a variety, the bracts varying from 1 to 8, and from ⅙ to 1½ in.

6. **V. Colebrookianum,** *Wall. Cat.* 460; leaves large oblong crenate-serrate nearly glabrous, corymbs large on very short axillary branches stellate-hairy, corolla rotate, drupe ellipsoid, seed hardly grooved. V. lutescens, *H. f. & T. in Journ. Linn. Soc.* ii. 176, *not of Blume*; *Kurz For. Fl.* ii. 2 (*as to Var. 2 only*).

Subtropical HIMALAYA, alt. 1–5000 ft.; SIKKIM and BHOTAN, common. ASSAM and KHASIA MTS., alt. 0–4000 ft., frequent.

A large spreading shrub, 6–15 ft.; flowering branches usually pendent with large terminal leaves, corymbs from axils below them. *Leaves* 5½ by 2 in., shortly acuminate, cuneate at the base, young and petiole (¼–½ in.), stellately pubescent. *Corymbs* umbelliform, dense on a portion of the branch bare of leaves; bracts minute, bracteoles 0. *Calyx-tube* glabrous, teeth minute. *Corolla*-lobes $\frac{1}{16}$ in., round, white. *Drupe* ⅕ by ⅙ in., hardly compressed, red: seed obscurely convex dorsally, concave ventrally.—*V. lutescens, Blume,* united with this by H. f. & T. has berries ⅓ in. long, narrowly obovoid-oblong, with deeply grooved seed, and terminal inflorescence.

7. **V. punctatum,** *Ham. in Don Prodr.* 142; leaves elliptic-lanceolate coriaceous subentire glabrous punctate beneath, corymb branches angular and calyx-tube minutely scaly, corolla rotate. *Wall. Cat.* 456; *DC. Prodr.* iv. 324; *H. f. & T. in Journ. Linn. Soc.* ii. 176; *Brandis For. Fl.* 260.

NIPAL, *Wallich.* KUMAON; Sarju Valley, alt. 4000 ft., *Strach. & Winterb.*

A stout spreading shrub. *Leaves* 3½ by 1½ in., acute at both ends, often with peltate scales on the midrib beneath; petiole ⅓ in. *Corymbs* terminal, sessile, in flower 2–6 in. diam., branches umbellate or corymbose, cinnamoneous when dried; bracts ¼ in., lanceolate, deciduous; bracteoles scarcely $\frac{1}{30}$ in., ovate. *Calyx-teeth* minute, obtuse. *Corolla*-lobes $\frac{1}{12}$ in., round, white. *Anthers* large, much exserted. *Drupe* ¼ by ⅕ in., ellipsoid, succulent. *Seed* 2-grooved dorsally, concave 3-grooved ventrally.

VAR. *acuminata, Wall. Cat.* 465 (sp.); leaves acuminate, bracts persistent, berry ⅓ by ⅕ in. squamulose, seed much compressed obscurely grooved. V. acuminatum, *DC. Prodr.* iv. 324; *W. & A. Prodr.* 388; *Wight Ic.* t. 1021; *Bedd. Fl. Sylv.* t. 217. V. Wightianum, *Herb. Hohen.* No. 1381, *not of Wall.*—Deccan Mts. alt. 4000–7000 ft., common.—The berry looks so different that it may indicate a distinct species.

8. **V. sambucinum,** *Reinw.*; *Blume Bijd.* 656; leaves elliptic-lanceolate entire nearly glabrous, corymb-branches and calyx-tube pubescent, corolla rotate. *DC. Prodr.* iv. 325; *Miq. Fl. Ind. Bat.* ii. 120; *Oersted in Vidensk. Meddel.* 1860, t. 7, *fig.* 11–13. V. integerrimum, *Wall. Cat.* 457; *DC. Prodr.* iv. 324; *H. f. & T. in Journ. Linn. Soc.* ii. 176.

PINANG and SINGAPORE; *Wallich, Walker.* MALACCA; Maingay *Kew Distrib.* 712/2.—DISTRIB. Malaya.

A stout shrub, or small tree, 20 ft. *Leaves* 5 by 2½ in., shortly acuminate, base broad-cuneate, impunctate, minutely pilose on the midrib beneath (or in Java examples often more hairy); petiole ½–¾ in., pilose. *Corymb* terminal, peduncled, umbellate, 2–4 in. diam.; bracts 0, or rarely caducous; bracteoles minute, linear-oblong. *Corolla*-lobes $\frac{1}{12}$ in., round, yellow-white. *Drupe* ¼ by ⅕ in., compressed, ovate, suddenly acute; endocarp thickened, subosseous. *Seed* dorsally 2-grooved, ventrally 3-grooved little concave.—Leaves in some Japan specimens are hairy beneath, in others, as in Wallich's *V. integerrimum.*

** *Corolla tubular, lobes very short erect or scarcely spreading.*

9. **V. coriaceum,** *Blume Bijd.* 656; leaves oblong-lanceolate acuminate coriaceous glabrous with tufts of hairs on the axils of the nerves beneath,

corymbs pubescent upwards, bracteoles 0 or caducous, corolla-tube glabrous. *DC. Prodr.* iv. 329; *H. f. & T. in Journ. Linn. Soc.* ii. 179; *Miq. Fl. Ind. Bat.* ii. 120; *Brandis For. Fl.* 259; V. cylindricum, *Ham. in Don Prodr.* 142; *DC. l. c.* 329.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from KUMAON to BHOTAN and KHASIA MTS., alt. 3–5000 ft., frequent.—DISTRIB. North Birma; Java.

A large shrub, or small tree, 15–20 ft. *Leaves* 4–9 by 2–2½ in., base cuneate or obtuse, quite entire in some Himalayan, often toothed in Javanese and Sikkim specimens, often punctate beneath; petiole ½–1 in., glabrous or subpilose. *Corymb* terminal, peduncled or sessile, umbellate or corymbose; bracts ¼ in., linear, caducous; bracteoles minute, ovate. *Calyx-tube* glabrous or puberulous; limb 0. *Corolla-tube* ⅛ in., white. *Anthers* oblong, exserted. *Drupe* ⅕ by ⅙ in., moderately compressed, elliptic, shortly acute, black. *Seed* 2-grooved dorsally; endocarp subosseous, 3-grooved ventrally little concave.

VAR. *capitellata*, Wight Ic. t. 1022 (sp.), leaves entire or subsinuate, corolla glabrous (pilose in Wight's Ic.), drupe ⅓ by ⅛ in., much compressed. V. hebanthum, *Thw. Enum.* 136 *partly, not of W. & A.*—Deccan Mts. alt. 4–7500 ft. Ceylon on Adam's Peak (C. P. n. 39).

VAR. *zeylanica*, Gardner ms. (sp.); berry ¼ by ⅕ in. broad ovoid very little compressed. *Oersted in Vidensk. Meddel.*. 1860, t. vii. *fig.* 24, 25. V. hebanthum, *Thw. Enum.* 136 *partly.* V. coriaceum, var. β, *H. f. & T. in Journ. Linn. Soc.* ii. 179. —Ceylon, alt. 6000 ft., *Gardner, Thwaites.*

10. **V. hebanthum,** *W. & A. Prodr.* 388; leaves oblong acuminate coriaceous sinuate or sinuate-dentate glabrous with tufts of hairs in the axils of the nerves beneath, corymbs minutely pilose upwards, bracteoles ⅕ in. linear, corolla-tube densely pubescent. *Wight Ic.* t. 1023; *H. f. & T. in Journ. Linn. Soc.* ii. 179, *excl. syn. V. pubigera*; *not of Thwaites.*

NILGHERRY MTS., alt. 4–7500 ft., frequent; Mayaburam, *Sir F. Adam.*

A large shrub, doubtfully distinct from *V. coriaceum* by the densely pubescent yellowish corolla. The fruit resembles that of *V. coriaceum*, var. *capitellata*, but the leaves are rarely entire as in var. *capitellata*, and are less acuminate.

SECT. II. **Pseudo-Tinus.** *Cymes* corymbose or umbellately divided. *Drupe* succulent, 1-celled, compressed; endocarp slightly intruded. *Albumen* ruminated, margins incurved.

11. **V. cordifolium,** *Wall. Cat.* 462; leaves elliptic cordate acuminate sharply serrate, stellately pubescent on the nerves beneath, corymbs not radiant terminal sessile stellately hairy, corolla rotate. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 175.

TEMPERATE HIMALAYA, alt. 9–12,000 ft., from KUMAON to BHOTAN, frequent.

A large shrub, flowering before leafing. *Leaves* 4½ by 2½ in., nearly glabrous above, parallel-veined; petiole ½–1 in. *Corymb* in flower small dense, in fruit 3–5 in. diam.; bracts ⅕ in., linear-oblong, woolly, caducous. *Calyx-tube* soon glabrous, lobes lanceolate, stellately woolly. *Anthers* small, shortly exserted. *Berry* ¼ by ⅕ in., little compressed. *Seed* dorsally with one shallow furrow, ventrally with much inflexed edges; testa full of red glands following the ruminations of the albumen.—*V. lantanoides, Michx.*, of N. America, has broader less serrate leaves, the corymbs usually radiant and the normal flowers much smaller; *V. furcatum, Blume*, of Japan, is almost identical with *V. lantanoides.* The three are closely allied and united by Miquel in *Ann. Mus. Lugd. Bat.* ii. 265.

SECT. III. **Tinus,** *Oerst.* (genus). *Cymes* umbellate. *Drupe* dry, hard, blue. *Albumen* ruminated.

12. **V. atro-cyanea,** *C. B. Clarke*; glabrous, leaves oblong narrowed at both ends not acuminate entire or obscurely sinuate-dentate, berry ellipsoid very smooth. Viburnum sp., *Griff. Itin. Notes*, 118.

MISHMI Mts., Thumathu summit, *Griffith* (Kew Distrib. No. 3406).

A shrub, resembling *V. Tinus, L. Leaves* 3 by 1¼ in., axils of the nerves beneath naked. *Cymes* terminal, subsessile; branches angular, red, slightly thickened; bracts small, caducous. *Flowers* not seen. *Berry* ⅓ by ⅙ in.; endocarp slightly intruded. *Albumen* strongly ruminated; testa with many red glands.—The European *V. Tinus* has a much larger, ovoid, somewhat ribbed drupe, and hairy nerve-axils beneath.

SECT. IV. **Microtinus,** *Oerst.* (genus). *Cymes* panicled. *Corolla* rotate. *Drupe* succulent, sub-2-celled, 1-seeded. *Albumen* uniform, margins incurved so as nearly to include the barren cell.

13. **V. odoratissimum,** *Ker in Bot. Reg.* t. 456; leaves elliptic acute coriaceous subentire glabrous, panicle glabrous, bracts and bracteoles lanceolate stellately-hairy caducous. *H. f. & T. in Journ. Linn. Soc.* ii. 177; *Benth. Fl. Hongk.* 143; *Oersted in Vidensk. Meddel.* 1860, 294, t. 6, fig. 7–10 (Microtinus).

KHASIA MTS., alt. 4000 ft., *Mrs. Mack*, &c.—DISTRIB. N. Birma, China.

A shrub, 6–10 ft. *Leaves* 5½ by 2¼ in.; base cuneate, entire or sparingly sinuate-dentate, primary nerves remote pinnate glandular, sometimes slightly hairy in the axils beneath; petiole ½–1 in., stout. *Corymb* 2–4 in. high, mostly peduncled; bracts ⅕ in., lanceolate, woolly in the Indian examples, minutely pubescent in the Chinese. *Calyx-limb* very wide, with shallow triangular teeth. *Corolla-lobes* ⅙ in., elliptic, white. *Berry* nearly ⅓ by ⅕ in., ovoid-oblong, hardly compressed.

14. **V. Simonsii,** *H. f. & T. in Journ. Linn. Soc.* ii. 177; leaves elliptic-lanceolate coriaceous denticulate or subentire glabrous, panicle pubescent, bracts and bracteoles lanceolate pubescent persistent.

KHASIA MTS., alt. 4–6000 ft.; not rare; *Simons*, &c.

A shrub, 6–15 ft. *Leaves* 4 by 2 in.; base rhomboid or obtuse, nerves parallel, much closer than in *V. odoratissimum*, with large tufts of hairs in the axils beneath; petiole ¼–½ in. *Corymb* flowers and fruit nearly as in *V. odoratissimum*, but both corolla and berry somewhat smaller.

SECT. V. **Solenotinus,** *Oersted* (genus). *Cymes* panicled, or thyrsiform. *Corolla* tubular. *Drupe* succulent, sub-3-celled, 1-seeded. *Albumen* uniform, margins incurved forming a T-shaped ventral groove.

15. **V. erubescens,** *Wall. Pl. As. Rar.* ii. 29, t. 134; *Cat.* 459; leaves oblong acute serrulate pilose on the nerves beneath otherwise glabrous, panicles peduncled terminal and many on shortened lateral branches. *DC. Prodr.* iv. 329; *H. f. & T. in Journ. Linn. Soc.* ii. 177; *Thwaites Enum.* 136; *Brandis For. Fl.* 258. V. Wightianum, *Wall. Pl. As. Rar.* ii. 29; *Cat.* 3729; *W. & A. Prodr.* 388; *Wight Ic.* t. 1024. V. pubigerum, *W. & A. Prodr.* 389. Viburnum sp., *Wall. Cat.* 7474.

HIMALAYA, alt. 3–10,000 ft.; from KUMAON to BHOTAN, common. DECCAN MTS., alt. 5–8000 ft., common. CEYLON.

A large shrub, or small tree. *Leaves* never large, 2½–3 by 1¼ in., from ovate to narrow-oblong, base obtuse, axils of nerves beneath very hairy in Deccan examples nearly glabrous in the others; petiole ¼ in. *Corymb* usually pendulous, small in the Deccan examples, sometimes 3–5 in. in the Himalayan, pubescent, nearly glabrous or sometimes stellately tomentose; bracts linear, ¾ in., glabrous, sometimes ⅕ in. and pubescent. *Calyx-teeth* small, oblong, glabrous or pubescent. *Corolla-tube* ⅕ in.; lobes ⅛ in., round, spreading, white. *Stamens* inserted at the same height near the

summit of the tube. *Drupe* $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid, scarcely compressed, red, crowned by the thick short style. Deccan specimens have more slender panicles, smaller flowers and rather narrower berries than Himalayan, but some Ceylon specimens appear altogether undistinguishable from the Himalayan.

16. **V. nervosum,** *Don Prodr.* 141, *not of Hk. & Arn.*; leaves elliptic-oblong acute crenate-serrate parallel-nerved hairy on the nerves beneath, cymes subcapitate silky, bracts oblong obtuse silky deciduous. *DC. Prodr.* iv. 327; *H. f. & T. in Journ. Linn. Soc.* ii. 178; *Brandis For. Fl.* 259. V. grandiflorum, *Wall. Cat.* 464; *DC. l. c.* 329; *Oersted in Vidensk. Meddel.* 1860, 295, t. 6, *fig.* 1–4 (Solenotinus).

HIMALAYA, alt. 10–13,000 ft., from KASHMIR to SIKKIM, not common; *Wallich*, &c.

A large shrub, or gnarled small tree; branchlets pilose. *Leaves* $2\frac{1}{2}$–3 by $1\frac{1}{4}$ in., scarcely acuminate, base cuneate, adult glabrous above; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* appear before the leaves; branches very short; outer bracts ovate, $\frac{3}{4}$ in. diam., obtuse; inner $\frac{3}{4}$ by $\frac{1}{4}$ in., oblong. *Calyx-tube* glabrous, teeth small, irregular, often ciliate. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ in.; lobes $\frac{1}{6}$ in., elliptic, spreading, rose. *Stamens* inserted 2 near the top of the corolla-tube, 3 somewhat lower down. *Drupe* nearly $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid, hardly compressed.

17. **V. fœtens,** *Dcne. in Jacq. Voy. Bot.* 75, t. 84; leaves elliptic or oblong crenate-serrate glabrous, cymes thyrsiform branches glabrous or sparingly pilose ultimately lax. *Hk. f. & T. in Journ. Linn. Soc.* ii. 178; *Brandis For. Fl.* 259.

KASHMIR, alt. 6–10,000 ft., from MURREE to CHUMBA; *Jacquemont*, &c., not rare.

A large shrub; branchlets glabrous, or laxly pubescent. *Leaves* 3 by 1–$1\frac{1}{2}$ in., shortly acute, base cuneate or obtuse, parallel-nerved, adult glabrous except tufts of hairs in the axils of the nerves beneath. *Inflorescence* nearly as in *V. nervosum*, Don, but soon more lax and corolla larger; outer bracts ovate or oblong, deciduous; bracteoles linear, scarious, pubescent. *Stamens* inserted 2 near the top of the corolla-tube, 3 lower down. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, little compressed, red, edible.

4. TRIOSTEUM, *Linn.*

Herbs; stems from a perennial stock, simple, erect. *Leaves* opposite, sessile, connate, obovate, entire or sinuate. *Flowers* whorled in short terminal spikes (axillary in the non-Indian species), lurid, 2-bracteolate. *Calyx-tube* ovoid; lobes 5, short or long and foliaceous, persistent. *Corolla* narrow funnel-shaped, gibbous at the base; lobes 5, unequal, obtuse, imbricate. *Stamens* 5, inserted on the corolla-tube; anthers linear, included. *Ovary* 3–5-celled; style filiform, included, stigma capitate 3–5-lobed; ovules solitary in each cell, pendulous. *Berry* 2–3- (rarely 4–5-) celled, 2–3-seeded. *Seeds* oblong, angular; testa bony; albumen fleshy; embryo minute.—Species 3; 2 N. American, 1 Himalayan.

1. **T. hirsutum,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 180; hairy, spike short terminal, calyx-lobes minute, drupe 3-seeded. *DC. Prodr.* iv. 330. T. himalayanum, *Wall. Cat.* 484; *DC. Prodr. l. c.*; *H. f. & T. in Journ. Linn. Soc.* ii. 173.

NIPAL; Gossain Than, *Wallich*. SIKKIM; alt. 10–12,000 ft., *J. D. H.* KUMAON; alt. 10,500 ft., *Strach. & Winterb.*

Patently hairy. *Stems* 18 in. *Leaves* broadly elliptic-obovate obtuse, hairy on

both surfaces. *Spike* hardly 1 in.; peduncle scarce $\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla-tube* $\frac{1}{3}$ in. long, green without purple within. *Drupe* $\frac{1}{3}$ in., ovoid or ellipsoid trigonous, hairy towards the apex.—H. f. & T. have been misled by DC. into supposing that Wallich described *T. hirsutum* from Chittagong as a different species from *T. himalayanum.* The origin of the error appears to have been that DC. read Wallich's ms. locality "Gossain Than" as the Sanskrit spelling of Chittagong. DC. further misprints the fruit as 5-seeded, whereas Wallich states (rightly) 3-seeded.

5. **ABELIA,** *Br.*

Shrubs, branchlets slender. *Leaves* opposite, sometimes ternate, petioled, entire or toothed; stipules 0. *Flowers* axillary and terminal, in small trichotomous cymes or solitary, 2–4-bracteolate, white or rose. *Calyx-tube* narrow, striate; teeth 5, long, narrow, persistent. *Corolla* tubular or funnel-shaped, nearly regular; lobes 5, short, round. *Stamens* 4, inserted on the corolla-tube, subdidynamous. *Ovary* 3-celled; style filiform, stigma capitate subexserted; ovules in 2 cells several, in the 3rd solitary. *Fruit* coriaceous, narrowly oblong, surmounted by the long calyx-teeth, cells 3, 2 empty, the 3rd 1-seeded. *Seed* subcylindric, testa membranous, albumen fleshy; embryo short, cylindric.—DISTRIB. Species 5, from Kashmir to China and Japan; and 1 Mexican (perhaps a distinct genus).

1. **A. triflora,** *Br. in Wall. Pl. As. Rar.* 14, t. 15; leaves lanceolate entire, cymes 3–8-flowered, bracts lanceolate shining glabrous reticulate. *Wall. Cat.* 815; *DC. Prodr.* iv. 339; *Wight Ill.* ii. 72, t. 121 C.; *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Lindl. & Paxt. Fl. Gard.* t. 91; *Brandis For. Fl.* 257.

Temperate Himalaya from KASHMIR to KUMAON, alt. 5–10,000 ft., frequent.

An erect shrub, 3–6 ft. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$–1 in., acute, broadest near the cuneate or obtuse base, reticulate-nerved beneath, pilose especially on the margin or glabrous; tiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Cymes* sessile, i.e. bracts at their base 1 in. leaflike, but interme-ate between the leaves and bracts. *Calyx-teeth* $\frac{1}{4}$–$\frac{1}{3}$ in., linear, striate, ciliate. *rolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous or pilose without; lobes $\frac{1}{5}$–$\frac{1}{4}$ in., spreading. *Fruit* $\frac{1}{4}$ in., linear, narrowed upwards, glabrous or pilose.

VAR. *parvifolia*; leaves much smaller $\frac{3}{4}$ in. sometimes lobed or subpinnatifid, rolla smaller pubescent within and without.—Jhelum Valley and Wuzaristan, *ewart.*

6. **LONICERA,** *Linn.*

Shrubs, erect or scandent; buds scaly. *Leaves* opposite, petioled, sessile or connate, entire or in *L. heterophylla* sinuately-lobed. *Flowers* (in the Indian species) in peduncled pairs, often connate by their ovaries, bracteate and usually 2-bracteolate; peduncles axillary, solitary, or in subterminal panicles heads or clusters subtended by floral leaves. *Calyx-tube* ovoid; limb short, 5-toothed, deciduous or persistent. *Corolla* tubular, funnel-shaped or campanulate, tube short or long, gibbous or equal at the base, limb subequally 5-lobed or 2-lipped; lobes short or long. *Stamens* 5, inserted on the corolla-tube. *Ovary* 2–3-celled; style slender, stigma capitate; ovules several in each cell in double rows on axile placentas. *Berry* 2–3-celled or sub-1-celled. *Seeds* few in each cell, ovoid or oblong, albumen fleshy; embryo terete.—DISTRIB. Species 80, in temperate and subalpine regions of the Northern Hemisphere.

SUBGEN I. **Caprifolium,** DC. Scandent. Pairs of *flowers,* or some of

them, capitate or panicled. *Bracts* linear or small. *Corolla* 2-lipped. *Berry* crowned with the calyx-teeth.

In the simple lateral peduncles the bracts are undistinguishable from floral leaves: in the paniculate inflorescence of *L. japonica* the bracts are small linear.

1. **L. Leschenaultii,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 178; *Cat.* 471; leaves ovate or oblong, beneath and calyx grey tomentose, corolla long closely pubescent. *DC. Prodr.* iv. 334; *Wight Ill.* ii. t. 120 and 121 B.; *W. & A. Prodr.* 389; *H. f. & T. in Journ. Linn. Soc.* ii. 173, *not of Miq.* L. mollis, *Wight Ill.* ii. 71; *Wall. Cat.* 6301.

DECCAN MTS., alt. 5–8000 ft.; *Wight*, &c.

Branchlets tomentose. *Leaves* $1\frac{1}{2}$-$2\frac{1}{2}$ by 1-$1\frac{3}{4}$ in., acute or rounded, base cordate or obtuse, above glabrous or puberulous on the impressed nerves; petiole $\frac{1}{6}$ in. *Flowers* in shortened panicles; floral leaves $\frac{1}{2}$-1 in., petioled, ovate; bracts linear, $\frac{1}{8}$-$\frac{1}{6}$ in.; bracteoles ovate, minute. *Calyx-teeth* $\frac{1}{12}$ in., linear. *Corolla-tube* 1-$1\frac{1}{2}$ in., hairy within. *Style* glabrous or nearly so.--Rarely the pairs of flowers are solitary, when the elongate floral leaves which are close beneath the flower have been described as bracts.

2. **L. glabrata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 175; *Cat.* 474; leaves cordate-oblong acute coriaceous glabrous or nearly so rarely villous beneath, bracts $\frac{1}{24}$-$\frac{1}{8}$ in. lanceolate, calyx glabrous or nearly so, corolla glabrous. *DC. Prodr.* iv. 334; *H. f. & T. in Journ. Linn. Soc.* ii. 172, excl. syn. *L. ovata, Ham.*

Temperate Himalaya, alt. 4-8000 ft.; from NIPAL to BHOTAN; *Wallich*, &c.

Branchlets glabrous, or closely pubescent. *Leaves* 3 by $1\frac{1}{2}$ in.; nerves glabrous or pilose or villous beneath; petiole $\frac{1}{4}$-$\frac{1}{2}$ in. *Flower-spikes* short, often panicled; floral leaves gradually reduced, sometimes minutely pilose above, the uppermost lanceolate, sessile; bracteoles ovate, minute. *Calyx-tube* somewhat glaucous, rarely slightly hairy; teeth $\frac{1}{16}$ in. lanceolate. *Corolla-tube* $\frac{1}{2}$ in., rarely with a few scattered hairs without, hairy within. *Style* glabrous, or with scattered hairs Griffith's specimens from East Bhotan have the leaves very villous beneath.

3. **L. macrantha,** *DC. Prodr.* iv. 333; leaves cordate-oblong acu coriaceous villous beneath, floral usually greatly reduced, calyx-teeth hairy fruit, corolla-lobes hirsute in bud white fading to yellow. *Benth. Fl. Hong* 144; *Miq. in Ann. Mus. Lugd. Bat.* ii. 269; *Maxim. in Bull. Acad. Peter Mel. Biol.* x. 58. L. japonica, *Wall. Cat.* 473, *and in Roxb. Fl. Ind. ed. Carey Wall.* ii. 174; *H. f. & T. in Journ. Linn. Soc.* ii. 171, *not of Linn.* Caprifolium macranthum *and* japonicum, *Don Prodr.* 140.

Temperate Himalaya from NIPAL to BHOTAN, alt. 6–10,000 ft., frequent. KHASIA MTS., alt. 4–6000 ft.

Leaves $2\frac{1}{2}$ by 1 in., glabrescent or pilose on the surface above. *Peduncles* in subterminal panicles; upper floral leaves usually linear-lanceolate. *Bracts* $\frac{1}{8}$-$\frac{1}{6}$ in., linear; bracteoles very small. *Calyx-tube* glaucous, glabrous. *Corolla-tube* $\frac{3}{4}$-$1\frac{1}{4}$ in.—*L. japonica*, L., which is very closely allied, differs in the less coriaceous leaves, usually petioled ovate or spathulate floral leaves, more or less hairy calyx-tube, and less hirsute unexpanded pink or reddish corolla.

4. **L. acuminata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 472; leaves oblong cordate acute, bracts $\frac{1}{8}$–$\frac{1}{4}$ in. linear, calyx-tube glabrous, corolla-tube hairy lobes pubescent or glabrous, style densely fulvous hairy. *Wall. Cat.* 472; *DC. Prodr.* iv. 334. L. Loureirii, *H. f. & T. in Journ. Linn. Soc.* ii. 172 *not of DC.*

Temperate Himalaya from NIPAL, *Wallich*, to SIKKIM, alt. 7–11,000 ft.; *J. D. H.* &c.

Branchlets hairy. *Leaves* 4 by $1\frac{1}{4}$–$1\frac{3}{4}$ in., with scattered hairs on both surfaces, or glabrescent; petiole $\frac{1}{5}$ in., hairy. *Inflorescence* in terminal many-flowered heads, and also often axillary 2-flowered peduncles; floral leaves gradually reduced, the uppermost linear-lanceolate, bracteiform; bracteoles $\frac{1}{16}$ in., subquadrate, ciliate. *Calyx-teeth* glabrate or ciliate in fruit. *Corolla-tube* $\frac{1}{3}$ in., funnel-shaped.—*L. Loureirii*, from Java? differs in the glabrous corolla-tube and style.

5. **L. ovata,** *Ham. in Wall. Cat.* 6300; leaves ovate or ovate-oblong obtuse membranous nearly glabrous, bracts $\frac{1}{16}$–$\frac{1}{12}$ in. ovate-lanceolate, calyx-tube glabrous, corolla-tube $\frac{1}{4}$ in. very slender glabrous, style hairy. Lonicera sp., *Griff. Journ.* 90.

ASSAM; *Hamilton, Masters.*—DISTRIB. Birma.

A slenderer plant. with much smaller flowers than in *L. glabrata*. *Branchlets* pubescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$–1 in., base rounded or subcordate, minutely pilose on both surfaces or glabrescent; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Upper peduncles* in terminal panicle; bracteoles minute, ovate. *Flowers* white, fading to yellow. *Calyx-teeth* glabrous or ciliolate.

SUBGEN. II. **Xylosteum,** DC. Erect. *Peduncles* not panicled. *Calyx-limb* deciduous (in *L. asperifolia*; *L. rupicola* and others, subpersistent).

* *Bracts large, ovate; bracteoles* 0 *or minute.*

6. **L. hispida,** *Pall.*; *DC. Prodr.* iii. 338; glabrous or hairy, leaves elliptic-oblong, peduncles $\frac{1}{2}$–1 in., bracts obovate-elliptic boat-shaped hardly connate. *Ledeb. Fl. Ross.* ii. 389, *Ic.* t. 212; *H. f. & T. in Journ. Linn. Soc.* ii. 165. L. bracteata, *Royle Ill.* 237, t. 53.

Temperate and alpine HIMALAYA, alt. 9–13,000 ft.; from KASHMIR to KUMAON, frequent. SIKKIM, alt. 13–15,000 ft., *J. D. H.*—DISTRIB. Central Asia, Siberia.

Branchlets hispid-pilose or glabrescent. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., subobtuse, base rounded, hairy on both surfaces or glabrescent; petiole $\frac{3}{8}$ in. *Bracts* $\frac{1}{2}$–$\frac{2}{3}$ in., hispid ciliate or glabrescent. *Corolla-tube* $\frac{1}{3}$ by $\frac{1}{5}$ in., often hairy; lobes $\frac{1}{4}$–$\frac{1}{3}$ in., rounded, pink. *Style* glabrous or with scattered hairs. *Drupes* more than $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid, confluent or entirely separate. Cf. *Maxim. in Bull. Acad. Petersb. Mel. Biol.* x. 73.—Exceedingly variable as to hairiness; the branchlets, leaves and bracts are sometimes absolutely glabrous, and the leaves subscabrid beneath.

7. **L. glauca,** *H. f. & T. in Journ. Linn. Soc.* ii. 166, *not of Meerb.*; leaves small oblong obtuse glabrous hispidly ciliolate, peduncle hardly any, bracts $\frac{1}{4}$–$\frac{1}{3}$ in. ovate flat, calyx-limb deciduous.

Temperate N.W. HIMALAYA and WESTERN TIBET, 12–16,000 ft.; Nubra, Zanskar and Piti, *Thomson*; Tilail in Kashmir, *C. B. C.*; Gurwhal and Kumaon, *Strach. & Winterb.*

A glaucous, densely-branched, wiry undershrub, glabrous except as to the margins of the leaves. *Leaves* $\frac{2}{3}$ by $\frac{1}{4}$ in., obtuse, base hardly rounded; petiole $\frac{1}{12}$ in. *Bracts* glaucous, hispidly ciliate on the margins, usually free, or when the fruits coalesce sometimes much connate. *Calyx* glabrous, or nearly so. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{8}$ in., glabrous; lobes $\frac{1}{5}$ in., elliptic, yellow. *Style* glabrous. *Berry* $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid, pairs sometimes confluent into a spherical fruit. (Both confluent and non-confluent berries occur on one branch.)

8. **L. asperifolia,** *H. f. & T. in Journ. Linn. Soc.* ii. 166; leaves ovate-oblong subcordate, margin crisped and hispid, peduncle 0–$\frac{1}{3}$ in., bracts ovate

flat, berry crowned by the funnel-shaped calyx-limb. Xylosteum asperrimum, *Dcne. in Jacq. Voy. Bot.* 77, t. 85.

WESTERN TIBET, *Falconer*; ZANSKAR, alt. 13,000 ft., *Thomson*. KASHMIR to the KARAKORUM, alt. 12,000 ft., *C. B. C.* Rimkim (Tibet), alt. 13,500 ft., *Strach. & Winterb.*

A shrub, 2–4 ft.; branchlets sparsely hispid. *Leaves* $1\frac{1}{4}$ by $\frac{3}{4}$ in., subacute or obtuse, shining and glabrous above; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Bracts* $\frac{1}{3}$ in., and ovaries free. *Calyx-tube* glabrous; limb ciliate or glabrous. *Corolla-tube* $\frac{1}{2}$ by $\frac{1}{6}$ in., glabrous or slightly hairy; lobes $\frac{1}{4}$ in. or more. *Style* glabrous. *Drupe* $\frac{1}{3}$ by $\frac{1}{4}$ in., or more, oblong.

** *Bracts linear or narrow-oblong* (*broad in* L. parvifolia); *bracteoles often connate or prominent.*

† *Corolla not distinctly two-lipped, often gibbous at the base, and limb unequal.*

9. **L. ligustrina,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 179; *Cat.* 479; branchlets pubescent, leaves lanceolate obtusely acuminate margin and midrib beneath ciliate or glabrescent, peduncle hardly any, bracteoles connate. *DC. Prodr.* iv. 334; *W. & A. Prodr.* 389; *Wight Ic.* t. 1025; *H. f. & T. in Journ. Linn. Soc.* ii. 166; *Bedd. Fl. Sylv. Anal. Gen.* t. 15, *fig.* 5. L. Wightiana, *Wall. Cat. under* 1520, *in Herb. Linn. Soc.*

? NIPAL; *Wallich*. KHASIA MTS., alt. 4000–6000 ft., *H. f. & T.* Mts. of the SOUTH DECCAN, alt. 6–7000 ft., frequent.

A shrub, 5–15 ft. *Leaves* $1\frac{3}{4}$ by $\frac{1}{2}$ in., base narrowed or scarcely rounded, firm, shining; petiole $\frac{1}{16}$ in. *Bracts* $\frac{1}{10}$ in., glabrous; bracteoles at first small, in fruit sometimes $\frac{1}{8}$ by $\frac{1}{4}$ in., forming a boat-shaped involucel half-enclosing the fruit. *Calyx-limb* tubular; margin irregular. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{12}$–$\frac{1}{16}$ in., narrowly funnel-shaped, base very gibbous, slightly pubescent; lobes $\frac{1}{5}$ in., obtuse, yellowish-white (Wallich). *Style* patently hairy. *Drupes* usually confluent into a single small spherical fruit, ovaries free or half-coalescent in bud.—Wallich's Nipal habitat must be considered doubtful till confirmed, owing to the mixture of specimens on one sheet.

10. **L. tomentella,** *H. f. & T. in Journ. Linn. Soc.* ii. 167; branchlets pubescent, leaves oblong villous or pubescent beneath, peduncles 0–$\frac{1}{4}$ in., bracteoles short connate.

Temperate HIMALAYA; SIKKIM, Lachen and Lachoong, alt. 8–12,000 ft., *J. D. H.*

A shrub, 10–12 ft. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., obtuse at both ends; petiole $\frac{1}{8}$ in., tomentose. *Bracts* $\frac{1}{4}$–$\frac{1}{3}$ in., narrowly oblong, foliaceous; bracteoles $\frac{1}{20}$–$\frac{1}{16}$ in. long in fruit. *Calyx* glabrous. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., subequal, pilose without and within; lobes hardly $\frac{1}{8}$ in., little spreading, white. *Style* glabrous. *Berry* $\frac{1}{4}$ by $\frac{1}{5}$ in., black, often coalescent in pairs into one spherical fruit. *Seeds* numerous, small.

11. **L. purpurascens,** *H. f. & T. in Journ. Linn. Soc.* ii. 169; leaves oblong or obovate-oblong hairy at least beneath, peduncles $\frac{1}{3}$–1 in., bracteoles small quadrate subobsolete in the fruit, calyx-limb patelliform truncate glabrous. L. sericea, *Royle Ill.* 236; *H. f. & T. in Journ. Linn. Soc.* ii. 167. Xylosteum purpurascens, *Dcne. in Jacq. Voy. Bot.* 79, t. 87.

Subalpine Himalaya; KASHMIR, alt. 9–12,000 ft.; Pir Pinjal, *Jacquemont*, *C. B. C*; Goolmurg, *Stewart*. KUNAWUR; alt. 12–13,000 ft., *Munro*. SIKKIM, Yeumtong, alt. 11,000 ft., *J. D. H.*

A shrub, 8 ft.; branchlets pilose, ultimately glabrous. *Leaves* 1 by $\frac{1}{2}$ in., obtuse, base narrowed or obtuse, above softly pilose or glabrescent, beneath villous or hairy on the nerves only; petiole $\frac{1}{8}$ in. *Bracts* $\frac{1}{6}$–$\frac{1}{4}$ in., linear or lanceolate-linear; bracteoles distinct or connate. *Corolla-tube* $\frac{1}{3}$ by $\frac{1}{10}$ in., base gibbous, hairy within and

without; lobes short, purple. *Style* sparsely pilose. *Fruit* usually of two confluent drupes, $\frac{1}{4}$ in. diam., globose, black. *Seeds* many or few.—*Royle's* specimens have the leaves and flowers more hairy: the number of seeds varies on the same branch.

12. **L. angustifolia,** *Wall. Cat.* 480; leaves lanceolate white beneath, peduncles $\frac{1}{3}$–1 in., bracts $\frac{1}{6}$–$\frac{1}{2}$ in. linear or linear-lanceolate, bracteoles connate often half as long as the fruit, calyx-limb distinctly 5-toothed. *DC. Prodr.* iv. 337; *Journ. Hort. Soc. Lond.* iii. 238, *with a fig.*; *H. f. & T. in Journ. Linn. Soc.* ii. 167; *Brandis For. Fl.* 255.

Temperate Himalaya; from KASHMIR and KUMAON, alt. 6–12,000 ft., frequent, to SIKKIM; Lachen, alt. 10–12,000 ft., *J. D. H.*

A shrub, 6–12 ft.; branchlets glabrescent. *Leaves* $1\frac{1}{4}$ by $\frac{1}{4}$ in. (nearly $\frac{1}{2}$ in. broad in Sikkim sp.), narrowed at both ends, beneath pubescent or glabrous; petiole $\frac{1}{8}$ in. *Bracts* linear or foliaceous. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{10}$ in., glabrous or pubescent, subequal; lobes hardly $\frac{1}{5}$ in., white or rose. *Style* short, glabrous. *Fruit* usually of two confluent drupes, $\frac{1}{4}$ in. diam., globose; calyx-limb often subpersistent. *Seeds* few.

13. **L. rupicola,** *H. f. & T. in Journ. Linn. Soc.* ii. 168; leaves oblong tomentose beneath, peduncles hardly any, bracteoles small quadrate distinct obsolete in the fruit, calyx-teeth $\frac{1}{8}$ in. narrow-lanceolate pubescent.

EASTERN TIBET (North of Sikkim), alt. 16–17,000 ft., *J. D. H.* Rimkim, WESTERN TIBET (North of Kumaon), alt. 13,500 ft., *Strach. & Winterb.*

A rigid shrub, 2–4 ft.; branchlets pubescent, becoming leafless and subspinescent. *Leaves* $\frac{1}{2}$ by $\frac{1}{5}$ in., subobtuse at both ends, nearly glabrous above; petiole $\frac{1}{16}$ in. *Bracts* [illegible] in., linear-obovate, often subfoliaceous, tomentose beneath. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., pubescent; lobes $\frac{1}{5}$ in. broad-oblong, spreading. *Style* short, glabrous. *Berries* $\frac{1}{5}$–$\frac{1}{4}$ in., ellipsoid, not confluent in pairs, crowned by the long calyx-teeth.

14. **L. spinosa,** *Jacquem. ms.*; *H. f. & T. in Journ. Linn. Soc.* ii. 168; glabrous, leaves small narrow-oblong, peduncles hardly any, bracteoles quadrate connate inconspicuous in fruit, calyx-teeth $\frac{1}{12}$ in. narrow-oblong obtuse. Xylosteum spinosum, *Dcne. in Jacq. Voy. Bot.* 78, t. 86.

ALPINE HIMALAYA, alt. 11–16,000 ft.; from KASHMIR to Tibet north of SIKKIM. DISTRIB. Kashgar.

A rigid shrub, 2–4 ft.; branchlets glaucous, often leafless and spinescent. *Leaves* [illegible] by $\frac{1}{8}$–$\frac{1}{6}$ in., obtuse, margins recurved, base narrowed; petiole hardly any. *Flowers* subfasciculate; bracts $\frac{1}{6}$–$\frac{1}{3}$ in., linear-oblong. *Corolla-tube* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{8}$ in., glabrous, subequal; lobes $\frac{1}{6}$ in., elliptic. *Style* glabrous, exserted. *Berries* $\frac{1}{5}$ by $\frac{1}{6}$ in., ellipsoid, not confluent in pairs, crowned by the subpersistent calyx-limb.

15. **L. parvifolia,** *Edgw. in Wall. Cat.* 9058, *and in Trans. Linn. Soc.* xx. 60; leaves small oblong or obovate glabrous, peduncles $\frac{1}{5}$–$\frac{1}{3}$ in., bracts $\frac{1}{6}$–$\frac{1}{3}$ in. oblong or ovate foliaceous, corolla-tube not widened upwards, style included. *H. f. & T. in Journ. Linn. Soc.* ii. 168. L. depressa, *Royle Ill.* 226.

Alpine Himalaya; KUMAON; *Blinkworth*; Pindari, alt. 12,000 ft., *Strachey & Winterbottom.* SIKKIM; alt. 12–14,000 ft., Lachen and Lama Kangra, *J. D. H.*

A small, rigid, nearly glabrous, shrub; branches often prostrate. *Leaves* $\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{3}$ in., obtuse, base cuneate rarely obtuse; petiole $\frac{1}{16}$ in. *Bracteoles* connate, often nearly as long as the ovary, inconspicuous in fruit. *Calyx* glabrous; teeth minute, triangular. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., exactly cylindric, equal, glabrous without, hairy within; teeth $\frac{1}{10}$ in., round, pink-purple. *Style* short, glabrous. *Berries* $\frac{1}{4}$ by $\frac{1}{5}$ in., ellipsoid, not confluent in pairs; seeds few.

VAR. *Myrtillus,* H. f. & T. in Journ. Linn. Soc. ii. 168 (sp.); bracts linear-oblong or sublinear. *Brandis For. Fl.* 255.—Kashmir to Kumaon, alt. 8–12,000 ft. Sikkim; alt. 11–14,000 ft., Lachen, *J. D. H.*

16. **L. obovata,** *Royle mss.*; *H. f. & T. in Journ. Linn. Soc.* ii. 169; glabrous, leaves small obovate-oblong, peduncle $\frac{1}{8}$–$\frac{1}{4}$ in., bracts $\frac{1}{6}$–$\frac{1}{4}$ in. linear ovate or oblong rarely foliaceous, corolla tube widened upwards, style exserted glabrous.

Temperate Himalaya, from KASHMIR to KUMAON, alt. 8-13,000 ft., frequent. SIKKIM, Lachen, alt. 12–14,000 ft., *J. D. H.*

A shrub, 6 ft. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., subsessile, obtuse, base narrowed. *Bracteoles* small or 0, distinct or connate, obsolete or cupshaped in fruit. *Calyx-limb* very short, undulate, hardly toothed. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{6}$ in., tubular-funnel-shaped, base narrowed prominently gibbous or campanulate and subequal, glabrous without, hairy within; teeth $\frac{1}{6}$ in., round, suberect, yellowish white. *Berries* spherical, $\frac{1}{5}$ in. diam., with 2 calyx-scars, calyx-tubes more or less coalescent even in the bud.

†† *Corolla prominently 2-lipped.*

a. Bracteoles connate into a cup.

17. **L. quinquelocularis,** *Hardwick in As. Res.* vi. 351; leaves ovate or broad-lanceolate hairy beneath, peduncles hardly any, bracts $\frac{1}{8}$–$\frac{1}{6}$ in. linear, calyx-limb short funnel-shaped teeth triangular ciliate. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 174; *H. f. & T. in Journ. Linn. Soc.* ii. 169; *Brandis For. Fl.* 255. L. diversifolia, *Wall. l. c.* 178, *Cat.* 477; *Hook. Ic. Pl.* t. 807; *Lindl. in Bot. Reg.* 30, t. 33. L. Royleana, *Wall. Cat.* 478.

TEMPERATE HIMALAYA from Kashmir to Kumaon; alt. 4-12,000 ft., com[illegible] BHOTAN; *Griffith.*

A shrub, 5-10 ft.; branchlets pubescent. *Leaves* $1\frac{1}{2}$–2 by $\frac{3}{4}$–$1\frac{1}{2}$ in., acut[illegible]r obtuse at either end, nearly glabrous above, pubescent pilose or villous bene[illegible] petiole $\frac{1}{8}$ in. *Flowers* clustered, axillary; bracteoles pubescent, usually scarcely [illegible]e length of the fruit. *Corolla* hairy without and within, yellow; tube $\frac{1}{3}$ by $\frac{1}{8}$ in. *Style* hairy, exsert. *Berries* $\frac{1}{4}$ by $\frac{1}{6}$ in., ovoid, not connate; crowned, till ripe often, by the calyx-limb.

18. **L. hypoleuca,** *Dcne. in Jacq. Voy. Bot.* 81, t. 89; leaves o[illegible] obtuse pubescent white beneath, peduncle $\frac{1}{6}$–$\frac{1}{3}$ in., bracts $\frac{1}{5}$ in. lance[illegible] foliaceous, bracteoles hairy as long as the glandular-pubescent calyx-tube. [illegible] *f. & T. in Journ. Linn. Soc.* ii. 170; *Brandis For. Fl.* 256. L. elliptica, *R[illegible]le Ill.* 236.

NORTH-WEST HIMALAYA, alt. 8-10,000 ft., *Royle, Edgeworth.* Kunawar, *Thom[illegible]n, Lance.* Gurwhal, *Strach. & Winterb.*

A low shrub; branchlets pilose. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., subsessile, obtuse at both ends, upper narrower, passing into the bracts. *Calyx-teeth* minute, lanceolate. *Corolla-tube* $\frac{1}{4}$ by $\frac{1}{8}$ in., base gibbous; lobes $\frac{1}{4}$ in. and more, linear-oblong, orange-red; style hairy below. *Berries* $\frac{1}{5}$ by $\frac{1}{6}$ in., ellipsoid, hairy, distinct or nearly so, nearly included by the bracteoles.—H. f. & T. say the ovaries are usually connate, but they appear rarely and imperfectly so.

19. **L. decipiens,** *H. f. & T. in Journ. Linn. Soc.* ii. 170; leaves oblong-lanceolate acuminate minutely hairy, peduncles $\frac{1}{6}$–$\frac{1}{2}$ in. pubescent, bracts $\frac{1}{12}$ in. linear, bracteoles ovate nearly glabrous as long as the glabrate calyx-tube. L. lanceolata, *Wall. Cat.* 475. Symphoriæ sp., *Griff. Itin. Notes,* 191.

Central and Eastern Himalaya; Nipal; *Wallich.* SIKKIM, Lachen, alt. 10-12,000 ft., *J. D. H., Elwes.* BHOTAN; Timboo River, alt. 6500 ft., *Griffith.*

A small shrub; branchlets pubescent. *Leaves* 2 by $\frac{3}{4}$ in., subsessile, base obtuse, more or less pubescent on the midrib and nerves above, beneath glandular-pubescent with the midrib hairy; petiole $\frac{1}{12}$ in. *Calyx-teeth* minute, ovate acute ciliate.

Corolla-tube 1/4 by 1/8 in., base gibbous, glabrous without, hairy within; lobes 1/4 in., red-purple. *Style* shortly exsert, hairy to the summit. *Drupes* distinct or completely confluent.

β. *Bracteoles small or* 0, except 21. *L. orientalis.*

20. **L. microphylla,** *Willd.*; *Roem. & Schult. Syst.* v. 258; leaves small oblong or obovate pubescent beneath, peduncles 1/4–1 in., bracts 1/8–1/6 in. linear, bracteoles 0, calyx-limb truncate. *DC. Prodr.* iv. 336; *H. f. & T. in Journ. Linn. Soc.* ii. 171. L. Sieversiana, *Bunge Verz. Altai-Geb.* 18.

WESTERN TIBET; Kashmir to the Karakorum, alt. 11–14,000 ft., frequent.—DISTRIB. Northward to the Altai Mts.

A small, erect, shrub; branchlets glabrous or nearly so. *Leaves* subsessile, 1/2–3/4 by 1/4–1/3 in., obtuse, base narrowed. *Peduncle* minutely pubescent, slender. *Corolla-tube* 1/5 by 1/8 in., base gibbous, glabrous without sparsely pilose within; teeth 1/6 in., suberect. *Style* subexsert, very hairy below. *Berries* 1/5 in., ellipsoid; usually connate half-way.

21. **L. orientalis,** *Lamk. Dict.* i. 731; leaves ovate-lanceolate acute finely nerved above more or less pubescent beneath, peduncles 1/2–1 in. pubescent, calyx-teeth linear-lanceolate, corolla glabrous without or nearly so, tube short. *DC. Prodr.* iv. 337; *Jaub. & Spach. Ill.* t. 71; *H. f. & T. in Journ. Linn. Soc.* ii. 170; *Boiss. Fl. Or.* iii. 8; *Brandis For. Fl.* 256. L. Govaniana, *Wall. Cat.* 481; *DC. l. c.* 337.

TEMPERATE HIMALAYA, alt. 7–11,000 ft.; from Kashmir common, rarer eastward, to Kumaon.—DISTRIB. Western Asia.

A large shrub or tree, 25 ft., branches horizontal, flattened. *Leaves* 2½ by 1–1¼ in., acute, mucronate hardly acuminate, base narrowed or scarcely obtuse, midrib above pubescent, nerves fine and elevated when dried, beneath dotted and more or [illegible] pubescent; petiole 1/3–1/6 in. *Peduncle* stout, or slightly flattened, thickened [illegible]rds. *Bracts* 1/8 in., linear-lanceolate; bracteoles 0 or small, but in the Kashmir [illegible]reous form larger, well-marked even in fruit. *Corolla-tube* 1/8 in., base gibbous; [illegible] 1/4 in., pink. *Style* hairy, usually to the summit. *Berries* generally confluent. [illegible]AR. *discolor*, Lindl. in Bot. Reg. xxxiii. 1847, t. 44 (sp.); leaves glaucous [illegible]ath. *H. f. & T. in Journ. Linn. Soc.* ii. 171.—Kashmir, alt. 9–11,000 ft., [illegible]*son.*—Lindley's figure shows the corolla glabrous without, the calyx-teeth not [illegible]ter than occurs in *L. orientalis.* This agrees perfectly with Thomson's examples. But with these occur (as *L. discolor*) plants with pubescent leaves and corollas, which we refer to *L. alpigena.*

22. **L. heterophylla,** *Dcne. in Jacq. Voy. Bot.* 80, t. 89; glabrous or nearly so, leaves narrow oblong reticulate-nerved beneath, peduncle 1/2–1½ in., calyx-teeth short-triangular, corolla sparsely pilose, tube short. *H. f. & T. in Journ. Linn. Soc.* ii. 170.

WESTERN ALPINE HIMALAYA and W. TIBET; KASHMIR; Choupienne, *Jacquemont*; Burjila and Karakorum, alt. 12,000 ft., *C. B. Clarke.*

An erect shrub, 3 ft., branches glabrous, rigid, ascending. *Leaves* 2½ by 1/2–1 in., upper narrow-oblong, narrowed at both ends, margin irregularly sinuate or sublobate, above glabrous, even on the midrib; petiole 1/8 in. *Peduncles* rigid, compressed, thickened upwards, scarcely pubescent. *Bracts* 1/5 in., linear. *Corolla* nearly of *L. orientalis.* *Style* hairy to the summit. *Drupes* 1/4 by 1/5 in., never connate.—Appears distinct from every form of *L. orientalis*; but when *Hk. f. & T.* suggested it might be a variety thereof, they had seen no specimens.

23. **L. alpigena,** *Linn.*; *DC. Prodr.* iv. 336; leaves elliptic or oblong acute or acuminate pilose beneath, peduncles 1–2 in., calyx-tube pubescent limb

short, corolla glandular-hairy, tube very short. *Reich. Ic. Fl. Germ.* t. 1173; *H. f. & T. in Journ. Linn. Soc.* ii. 171; *Boiss. Fl. Orient.* iii. 8; *Brandis For. Fl.* 256. L. Webbiana, *Wall. Cat.* 476; *DC. l. c.* 336. L. oxyphylla, *Edgw. in Trans. Linn. Soc.* xx. 60.

KASHMIR to KUMAON, alt. 9–12,000 ft.; *Blinkworth*, &c.—DISTRIB. European Alps.

A large shrub; branchlets pubescent. *Leaves* 4 by 1–2 in., base rounded or cuneate, hairy or glabrate above, with pubescent nerves; nervation not prominent on either surface; petiole $\frac{1}{3}$ in. *Peduncle* stout, flattened, slightly thickened upwards, nearly glabrous. *Bracts* $\frac{1}{6}$ in., lanceolate or linear; bracteoles very small. *Corolla* nearly as in *L. orientalis*. *Drupes* free in the Indian specimens.—Not a Bhotan plant (as stated by Hook. f. and Thomson).

DOUBTFUL SPECIES.

LONICERA FINLAYSONIANA, *Wall. Cat.* 6302, was perhaps collected in Cochin-China: the specimen is poor, and may be *L. confusa, DC.*

L. CHINENSIS, CONFUSA and LONGIFOLIA, mentioned by *Royle* (*Ill.* 236) as common to the Himalaya, China, and Japan, are probably referable to *L. macrantha, DC.*

7. LEYCESTERIA, *Wall.*

Under-shrubs, with fistular stems and branches. *Leaves* opposite, distichous, caudate-acuminate, membranous, glaucous beneath, exstipulate or with very small stipules, entire or toothed. *Flowers* whorled, in terminal or axillary erect or drooping spikes subtended by small or large foliaceous bracts, 2-bracteolate. *Calyx-tube* ovoid, limb unequally 5-lobed, persistent. *Corolla* funnel-shaped, gibbously swollen at the base and limb subequally 5-lobed. *Stamens* 5, inserted on the throat of the corolla. *Ovary* 5–8-celled; style slender, stigma capitate; ovules many, 2-seriate in each cell. *Berry* oblong or subglobose, 5–8-celled, many-seeded. *Seeds* minute, testa crustaceous shining.

1. **L. formosa,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 181; *Pl. As. Rar.* ii. 20, t. 120; *Cat.* 470; branches stout, leaves ovate toothed, bracts large leafy, ovary 5-celled. *Bot. Mag.* t. 3699; *Wight Ill.* ii. t. 121 D. *Brandis For. Fl.* 256.

TEMPERATE HIMALAYA, alt. 5–10,000 ft., from Kumaon to Bhotan. KHASIA MTS., alt. 5–6000 ft., *H. f. & T.*

Branching from the base, branches 6 ft. *Leaves* 2–5 by 1–3 in., broadly ovate or ovate-lanceolate long acuminate, entire or irregularly toothed, white and more or less puberulous beneath, base rounded subacute or cordate; petiole $\frac{1}{6}$–1 in. *Spikes* 2 in., pubescent; bracts cordate laxly leafy, often purplish; bracteoles variable. *Flowers* glandular, puberulous. *Corolla* $\frac{1}{2}$–1 in., purplish-pink. *Style* glabrous. *Berry* subglobose, red.—*Flowers* rarely 3–4-merous.

2. **L. glaucophylla,** *Hook. f.*; branches slender, leaves lanceolate sinuate-toothed, bracts much shorter than the flowers, berry 7–8-celled. Lonicera glaucophylla, *H. f. & T. in Journ. Linn. Soc.* ii. 165; *Gard. Chron.* 1858, 700, *with fig.* L. gracilis, *Kurz in Journ. As. Soc.* 1870, pt. ii. 77. Pentapyxis sp., *Hook. f. in Gen. Pl.* ii. 6.

SIKKIM HIMALAYA, alt. 5–6000 ft.; Yoksun, *J. D. H.*; Simonbong, *Kurz.*

A much more slender plant than *L. formosa*, with narrower shorter-petioled leaves, and small axillary few-flowered spikes of puberulous flowers, the bracts of which

are shorter than the ovary and ovate-subulate. The stipules are entirely absent or more or less developed into a small semicircular coriaceous lamina. In the "Genera Plantarum," this species, of which the flower and fruit were then unknown, was supposed to be a *Pentapyxis* on account of the presence of stipules.

8. PENTAPYXIS, *Hook. f.*

A woolly erect shrub with solid stems and branches. *Leaves* opposite, distichous, coriaceous, ovate-lanceolate, caudate-acuminate, sinuate-toothed; stipules very large leafy, orbicular margins recurved. *Flowers* in axillary peduncled or sessile rarely terminal woollen spikes, with short bracts and bracteoles. *Calyx* funnel-shaped, subequally 5-cleft, persistent. *Corolla* funnel-shaped, gibbously swollen at the base; limb subequally 5-lobed. *Stamens* 5, inserted on the throat of the corolla. *Ovary* 5-celled: style slender, stigma capitate; ovules many, 2-seriate in each cell. *Berry* ellipsoid, 5-celled, many-seeded. *Seeds* minute; testa crustaceous, shining.

Closely allied to *Leycesteria*, but differing in the solid branches, calyx, and habit.

1. **P. stipulata,** *Hook. f.* Lonicera stipulata, *Hk. f. & T. in Journ. Linn. Soc.* ii. 165; *Gard. Chron.* 1858, 700, *with fig.*

SIKKIM HIMALAYA; at Darjeeling, alt. 6–10,000 ft., *J. D. H.*

A shrub, 6–8 ft., densely clothed except the leaves above with soft, white wool. *Leaves* 4–8 by 2–3 in., base rounded, subentire or sinuate-toothed, puberulous above or glabrate with deeply impressed nerves. *Stipule* $\frac{1}{4}$–$\frac{5}{8}$ in. diam., erect or reflexed. *Heads* dense, rarely subspicate; peduncle very stout; bracts about equalling the calyx, ovate. *Flowers* $\frac{5}{8}$ in. long, woolly, white. *Berry* hairy, $\frac{3}{4}$ in., pulp thin. *Seeds* ellipsoid.—Flowers sometimes 4-merous.

ORDER LXXV. RUBIACEÆ. (J. D. Hooker.)

Trees, shrubs or herbs, rarely annual, erect or twining, unarmed or spiny, rarely truly prickly. *Leaves* simple, opposite or whorled, quite entire, stipulate (except in *Galieæ*). *Inflorescence* various. *Calyx-tube* adnate to the ovary; limb various. *Corolla* regular, usually 4–5-lobed, lobes valvate, imbricate or contorted (to the left as seen from outside). *Stamens* as many as the lobes, inserted on the mouth or tube of the corolla, filaments short or long; anthers 2-celled, usually dorsifixed and dehiscing laterally or in front. *Disk* epigynous, usually annular or cushion-shaped. *Ovary* wholly inferior, 2–10-celled; style simple or cleft, stigmas various; ovules 1 or more in each cell. *Fruit* berried, capsular, drupaceous or of dehiscent or indehiscent cocci, 2–10-celled. *Seeds* various, albumen fleshy or horny. *Embryo* straight or curved; cotyledons flat or semiterete, radicle superior or inferior.—DISTRIB. Genera about 340 and species 4000, chiefly tropical and subtropical.

SERIES A. Ovules numerous in each cell (rarely solitary in *Cephalanthus* and a few *Hedyotideæ*).

TRIBE I. **Naucleeæ.** *Flowers* collected into dense globose heads. *Corolla* funnel-shaped; stigma simple.

* *Ovaries confluent; fruits forming a globose fleshy mass; corolla-lobes imbricate in bud.*

Ovary 2-celled, ovules numerous . . . . 1. SARCOCEPHALUS.
Ovary 4-celled above, 2-celled below, ovules many . . . 2. ANTHOCEPHALUS.
Ovary 2-celled, ovules solitary in each cell . . . . 3. CEPHALANTHUS.

** *Ovaries free or nearly so; fruits free, capsular.*

Flowers bracteolate, calyx-limb 5-lobed, corolla-lobes valvate . . . 4. ADINA.
Flowers bracteolate, calyx-limb entire, corolla-lobes valvate . . . 5. STEPHEGYNE.
Flowers ebracteolate, corolla-lobes imbricate . . . . . 6. NAUCLEA.
Flowers ebracteolate, corolla-lobes valvate, climbers with hooked peduncles . . . . 7. UNCARIA.

TRIBE II. **Cinchoneæ.** *Corolla-lobes* valvate, imbricate, or twisted in bud. *Fruit* capsular, 2-celled. *Seeds* winged.

Corolla-lobes valvate, style 2-fid, bracts leafy . . . . . 8. HYMENOPOGON.
Corolla-lobes twisted, style entire, flowers panicled, bracts simple . . . . 9. COPTOSAPELTA.
Corolla-lobes valvate, style entire, flowers in panicled spikes, bracts leafy . . . . 10. HYMENODICTYON.
Corolla-lobes imbricate, style 2-fid . . . . 11. LUCULIA.

TRIBE III. **Rondeletieæ.** *Corolla-lobes* (in the Asiatic genera) twisted in bud. *Fruit* capsular, 2-celled. *Seeds* angled, not winged. Shrubs or trees.

Flowers simply panicled . . . . 12. WENDLANDIA.
Flowers in subscorpioid cymes . . . . 13. GREENIA.

TRIBE IV. **Hedyotideæ.** *Corolla-lobes* valvate in bud. *Fruit* a loculicidal or septicidal 2- rarely 4-celled capsule, or of 2 or 4 dehiscent or indehiscent cocci, rarely altogether indehiscent. *Seeds* small or minute, rarely winged.—Herbs, rarely shrubs, never trees.

A. Leaves quite entire, stamens 4 or 5.

* *Fruit 2-celled, usually indehiscent, stipules entire.*

Corolla funnel-shaped, *lobes* 4–5-*toothed* . . . . 14. DENTELLA.
Corolla rotate, anthers large, stigma capitellate . . . . 15. ARGOSTEMMA.
Corolla funnel-shaped, stigma minute . . . . 16. CLARKELLA.
Corolla rotate, anthers connate, stigmas 2 . . . . 17. NEUROCALYX.

** *Fruit 4-celled, indehiscent, cells with* 1 *erect ovule.*

Fruit with 4 bony indehiscent pyrenes; stigmas 4 . . . . 18. ALLÆOPHANIA.
Fruit membranous, indehiscent, stigmas 2 . . . . 19. FERGUSONIA.

*** *Fruit oblong subglobose or orbicular, 2- rarely 4-celled, usually dehiscent, cells many- rarely* 1-*seeded.*

Capsule loculi- or septicidal, rarely indehiscent, with contiguous calyx-teeth, seeds usually angular . . . . . 20. HEDYOTIS.
Capsule loculicidal above the remote calyx-teeth, rarely indehiscent, seeds minute, angular . . . . 21. OLDENLANDIA.
Capsule loculicidal above the remote calyx-teeth, rarely indehiscent, seeds plano-convex, or globose with a ventral cavity . . . . 22. ANOTIS.
Capsule subglobose loculicidal, *strongly ribbed*, seeds minute angular, *flowers in secund cymes* . . . . 23. SPIRADICLIS.
Capsule globose septicidal, seeds minute angular, *flowers crowded in the short recurved distant branches of an erect peduncle* . . . . 24. POLYURA.

**** *Fruit broadly didymously obcordate, of 2 compressed spreading lobes, loculicidal above the calyx.*

Flowers crowded on the upper side of the branches of a peduncled cyme . . . . 25. OPHIORRHIZA.
Flowers scattered on the branches of a peduncled cyme . . 26. PARAOPHIORRHIZA.

B. Leaves crenate-serrate or undulate, stamens 2.

Capsule dry, 2-valved . . . . 27. CARLEMANNIA.
Capsule fleshy, 5-valved . . . . 28. SILVIANTHUS.

TRIBE V. **Mussændeæ.** *Corolla-lobes* valvate in bud. *Fruit* fleshy or drupaceous, indehiscent (rarely dehiscent). *Seeds* minute.

a. Inflorescence terminal. (*See also* 35. Adenosacme, *and* 41. Keenania.)

Flowers panicled or corymbose, calyx with one lobe usually forming a coloured leaf . . . . 29. MUSSÆNDA.
Calyx-lobes 5 slender, *ovary 1-celled* . . . . 30. ACRANTHERA.
Flowers capitate, calyx quite entire, stamens 4 . . . . . 31. LUCINÆA.
Calyx irregularly fissured, stamens 5 . . . . 32. LEUCOCODON.
Calyx 5-lobed, stamens 5 . . . . 33. POLYSOLENIA.
Flowers umbelled . . . . 34. TRISCIADIA.

β. Inflorescence usually axillary, flowers not involucrate.

Calyx 4–5-lobed, corolla reduplicate-valvate, berry 2–5-celled, cymes loose . . . . 35. ADENOSACME.
Calyx-lobes 5 rigid, drupe with 2 pyrenes, flowers capitate . 36. MYRIONEURON.
Calyx-limb 8–16-sinuate, corolla 8–16-partite, stamens 8–16, cymes axillary . . . . 37. AULACODISCUS.
Calyx 4–7-toothed, corolla 4–7-lobed, cymes axillary . . . 38. UROPHYLLUM.
Calyx-lobes 5 unequal leafy . . . . 39. SCHIZOSTIGMA.

γ. Flowers capitate, involucrate.

Climbing shrub, heads axillary . . . . 40. LECANANTHUS.
Erect or prostrate shrub, head terminal . . . . 41. KEENANIA.

TRIBE VI. **Gardenieæ.** *Corolla-lobes* twisted in bud. *Fruit* berried, fleshy or dry. *Seeds* usually large; cotyledons often foliaceous.

* *Seeds many in each cell, or few in* 41, 45 *and* 46.

Inflorescence terminal, flowers 2-sexual, stigma fusiform . 42. WEBERA.
Inflorescence terminal, flowers diœcious, stigma fusiform . 43. BYRSOPHYLLUM.
Inflorescence leaf-opposed, flowers diœcious, style-arms 2 . 44. BRACHYTOME.
Inflorescence lateral, corymbose, style-arms 2 . . . . . . 45. ANOMANTHODIA.
Inflorescence usually axillary, stigma fusiform, ovary 2-celled . . . . 46. RANDIA.
Inflorescence usually axillary, stigma fusiform, ovary 1-celled . . . . 47. GARDENIA.

** *Style-arms* 2, *free* (*rarely combined*), *ovary 2-celled, seeds usually few in each cell, inflorescence always axillary.*

Calyx-limb cupular 4-lobed, flowers in small cymes, testa coriaceous . . . . 48. HYPOBATHRUM.
Calyx-limb minutely 5-toothed, flowers in spikes, testa grooved . . . . 49. PETUNGA.
Calyx-limb cupular or 4-toothed, flowers diœcious capitate . 50. MORINDOPSIS.
Calyx-lobes 4–5 oblong, corolla rotate, testa plicate . . . 51. HYPTIANTHERA.
Calyx-teeth 4–5 very short, albumen ruminate . . . . . 52. NARGEDIA.

Calyx-limb elongate 4-lobed, flowers in spikes, testa grooved . 53. SCYPHOSTACHYS.
Calyx calyculate, limb truncate or 4–5-lobed, flowers fascicled, rarely cymose . . . . 54. DIPLOSPORA.

SERIES B. Ovules 2 in each cell (ovary 2-celled). See also 53. *Diplospora.* (Genera of uncertain affinity.)

Corolla-lobes twisted, ovules inserted together half-way up the cell, 1 pendulous, 1 erect . . . . 55. SCYPHIPHORA.
Corolla-lobes valvate, ovules erect on the top of an erect basilar placenta . . . . 56. JACKIA.

SERIES C. Ovules solitary in each cell. (See also 3. *Cephalanthus*, 18 *Allæophania*, 19. *Fergusonia*, 20. *Hedyotis*, 21. *Oldenlandia* and 41. *Webera.*)

SUBSERIES *a*. Radicle superior.

TRIBE VII. **Guettardeæ.** *Corolla-lobes* imbricate or valvate in bud. *Stamens* inserted on the mouth of the corolla. *Fruit* drupaceous with 2–many free or cohering pyrenes. *Seeds* cylindric; albumen scanty or 0.

Corolla imbricate, calyx-limb deciduous . . . . 57. GUETTARDA.
Corolla imbricate, calyx-limb persistent . . . . 58. ANTIRRHOËA.
Corolla valvate, calyx-limb cupular, ovary 4–12-celled . . 59. TIMONIUS.
Corolla valvate, calyx 5-toothed, corolla curved 2-lipped, ovary 2-celled . . . . 60. DICHILANTHE.

TRIBE VIII. **Knoxieæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted on the mouth of the corolla. *Fruit* of 2-cocci. *Seeds* dorsally compressed.

Albumen copious, herbs, fruit very small . . . . 61. KNOXIA.

TRIBE IX. **Alberteæ.** *Corolla-lobes* twisted in bud. *Stamens* inserted in the mouth of the corolla. *Ovary* 1-celled with 1–2 pendulous ovules, or 2–∞-celled with 1 ovule in each cell.

Corolla campanulate, style 8-grooved, ovary 1-celled, 1–2-ovuled . . . . 62. OCTOTROPIS.

TRIBE X. **Vanguerieæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted in the mouth of the corolla. *Drupe* with 2–many free or cohering pyrenes. *Seeds* various; albumen copious.

Ovary 2-celled, stipules equal . . . . 63. CANTHIUM.
Ovary 3–5-celled, stipules equal . . . . 64. VANGUERIA.
Ovary 2-celled, one stipule very large . . . . 65. MESOPTERA.

SUBSERIES *β*. Radicle inferior.

TRIBE XI. **Ixoreæ.** *Corolla-lobes* twisted in bud. *Ovary* 2–4-celled; ovules usually inserted about the middle of the cell, rarely basilar. *Fruit* a 2–4-celled berry or drupe with 2–4 free or united pyrenes. *Seeds* usually plano-convex.

Flowers panicled or corymbose, bracts coriaceous not sheathing . . . . 66. IXORA.
Flowers panicled or corymbose, bracts membranous lower sheathing . . . . 67. PAVETTA.
Flowers axillary fascicled or solitary . . . . 68. COFFEA.

TRIBE XII. **Morindeæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted in the mouth or throat of the corolla. *Ovules* usually inserted below the middle

of the cell, and amphitropous. *Fruit* a 2–4-celled berry, or a drupe with 2–4 pyrenes.

* *Calyx-tubes cohering in a head.*

Heads many-fld. solitary or umbelled . . . . 69. MORINDA.
Heads few-fld. somewhat spiked . . . . 70. RENNELLIA.

** *Flowers free.*

Calyx-limb 4–5-fid, corolla-throat villous, drupe with 1–4 pyrenes, flowers axillary. . . . . 71. DAMNACANTHUS.
Calyx-limb truncate, corolla-throat glabrous, berry 1–2-seeded, flowers terminal and axillary . . . . 72. PRISMATOMERIS.
Calyx-limb truncate, drupe with 4 pyrenes, flowers umbellate 73. CŒLOSPERMUM.
Calyx-limb annular, corolla-throat woolly, flowers in axillary heads . . . . 74. GYNOCHTHODES.

TRIBE XIII. **Psychotrieæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted near the mouth of the corolla. *Ovules* basilar, cuneate, anatropous. *Drupe* with 2 or more pyrenes. (See also 18. *Allæophania*, and 19. *Fergusonia.*)

* *Flowers in terminal rarely axillary corymbose or panicled rarely capitate cymes.*

Calyx-limb short 4–5-toothed, corolla usually short straight 75. PSYCHOTRIA.
Calyx-limb short 5-toothed, corolla-tube usually long curved 76. CHASALIA.

** *Flowers capitate or fascicled, axillary or terminal (or solitary in* Geophila).

Calyx with 4–7 rather long lobes, creeping herbs, leaves cordate 77. GEOPHILA.
Calyx with 4–5 short teeth, style arms 2, heads involucred . 78. CEPHAELIS.
Calyx-limb 3–6-fid. style-arms 3–9, leaves distichous . . . 79. LASIANTHUS.

*** *Flowers axillary and terminal, solitary or few, anthers 4 subsessile.*

Calyx-limb dilated unequally 4-lobed, drupe with 2 pyrenes, fetid shrubs . . . . 80. SAPROSMA.
Calyx-limb truncate, drupe with 2 pyrenes, stem tuberous, epiphytes . . . . 81. HYDNOPHYTUM.
Calyx-limb truncate, drupe with 3 pyrenes, stem tuberous, epiphytes. . . . . 82. MYRMECODIA.

TRIBE XIV. **Pæderieæ.** *Corolla-lobes* valvate in bud. *Stamens* inserted on the throat or base of the corolla. *Style-arms* 2–5, papillose all over. *Ovules* basilar, erect. *Fruit* capsular, 5-valved, or with 2 dorsally compressed pyrenes often pendulous from a columella; albumen copious or scanty.—Usually fetid climbing or erect shrubs.

Styles 2 capillary twisted, pyrenes 2. twining shrubs . . 83. PÆDERIA.
Style 5-fid, capsule 5-valved at the top, testa reticulated, erect shrubs . . . . 84. HAMILTONIA.
Style-arms 5, capsule 5-valved at the base, enclosing 5 pyrenes with reticulated coats, erect shrubs . . . . . 85. LEPTODERMIS.

TRIBE XV. **Spermacoceæ.** *Corolla-lobes* valvate in bud. *Ovary* 2- rarely 3–4-celled; style entire, stigma capitate or 2-fid, rarely style-arms elongate; ovules attached to the septum of the ovary, amphitropous. *Fruit* small, dry, capsular or of 2 cocci, or circumsciss at the base. *Seeds* usually oblong, deeply grooved on the ventral face.—Herbs, rarely undershrubs, leaves opposite, stipules usually setaceous.

Fruit of 2 indehiscent at length separating cocci . . . . 86. HYDROPHYLAX.
Fruit of 2 separable cocci, both or one only dehiscing ventrally . . . . 87. SPERMACOCE.
Fruit of 2 connate cocci, calyx-limb greatly enlarged . . . 88. GAILLONIA.

TRIBE XVI. **Galieeæ.** *Corolla-lobes* valvate in bud. *Ovary* 2-celled; style-arms 2; ovules attached to the base of the septum. *Fruit* of 2 small coriaceous or fleshy indehiscent lobes. *Seeds* peltate, usually hollowed ventrally. —Herbs; leaves usually whorled, without stipules.

Corolla rotate or shortly campanulate 5-merous . . . . 89. RUBIA.
Corolla rotate 4-merous . . . . 90. GALIUM.
Corolla funnel-shaped . . . . 91. ASPERULA.

TRIBE I. NAUCLEEÆ.

1. SARCOCEPHALUS, *Afzel.*

Shrubs or trees, sometimes climbing. *Leaves* petioled: stipules large or small. *Flowers* in axillary or terminal peduncled globose heads, without bracteoles, united by their confluent calyx-tubes: bracts 2, stipular. *Calyx* 4-6-toothed with deciduous appendages. *Corolla-tube* long, funnel-shaped, throat glabrous; lobes 5-6, orbicular, imbricate. *Stamens* 5-6, on the corolla mouth; anthers sessile, acute. *Ovary* 2-celled; style filiform, exserted, stigma capitate, oblong or spindle-shaped; ovules very many, imbricating upwards on pendulous placentas. *Fruits* combined in a fleshy globose mass of 2-celled pyrenes with very thin septa. *Seeds* few in each cell, minute, testa crustaceous, albumen fleshy; embryo rather large, radicle inferior. DISTRIB. Species 8, tropical Asiatic, African, and Australian.

1. **S. cordatus,** *Miq. Fl. Ind. Bat.* ii. 133; leaves elliptic ovate or cordate obtuse, peduncles solitary stout 1-headed, heads of fruit smooth. *Bedd. Fl. Sylv.* t. 318; *Kurz For. Fl.* ii. 63. S. Horsfieldii, *Miq. l. c.* 134. Nauclea cordata, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 509. N. coadunata, *Roxb. in Rees Cyclop.* N. Roxburghii, *G. Don Gen. Syst.* iii. 467, *excl. synon.* N. Wallichiana, *Br. in Wall. Cat.* 6098. N. parvifolia, *Wall. Cat.* 6093 B. Platanocarpum cordatum, *Korth. Naucl. Ind.* 16.

MALAY PENINSULA, from Pegu and Mergui to Malacca, *Wallich*, &c. CEYLON, *Walker*, &c.—DISTRIB. Malay and Philippine Islands, N. Australia.

A small tree. *Leaves* 5-12 by 4-8 in.: petiole 3/4-1 in.: stipules oblong, elliptic or obovate. *Heads* 1/2-1 in. diam., drooping: peduncle 1-1 1/2 in.: stipular bracts broad, almost basal. *Flowers* yellow, fragrant; calyx-lobes clavate. A form with leaves pubescent beneath, from the Malay Islands, is N. undulata, *Wall. Cat.* 6094 (*not of Roxb.*). The true N. undulata, *Roxb.*, is not Indian, it is Wallich's N. purpurea, 6090 *D.* (N. stipulacea, *Herb. Roxb.*, *not* N. Roxburghii, *G. Don Gen. Syst.* iii 467, which from the description is *S. cordatus* itself).

2. **S. subditus,** *Miq. Fl. Ind. Bat.* ii. 134; leaves lanceolate obtusely acuminate, peduncles solitary 1-headed, heads of fruit rough. Platanocarpum subditum, *Korth. Verh. Nat. Gesch. Bot.* 133, t. 32.

MALACCA, *Griffith.*—DISTRIB. Sumatra, Java.

Much more slender than *S. cordatus.* *Leaves* glabrous, 3-5 by 1 1/2-2 in., narrowed into the slender petiole, black when dry. *Peduncles* slender, pubescent, bracteate

about the middle. *Heads* ½ in. diam., fruiting with concave summits to the carpels and raised edges.

3. **S. Junghuhnii,** *Miq. Fl. Ind. Bat.* ii. 134; leaves elliptic abruptly obtusely pointed, peduncles 1–3-nate 1–3-headed, heads nearly smooth.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. 2772), *Maingay* (Kew Distrib. 822, 822¹).—DISTRIB. Sumatra.

Branchlets and peduncles puberulous. *Leaves* 4–5 by 2–2½ in., rather coriaceous, nerves with minute tufts of hair in the axils; petiole ¼–½ in.; stipules oblong. *Peduncles* ½–1½ in., with a small 4-lobed cup of bracts below the middle, of which 2 opposite are larger than the others. *Heads* ¼–⅓ in. diam., in fruit ⅔ in. diam.—I have seen no authentic specimen of *Junghuhnii*, but find the name attached by Maingay to his specimens. Miquel's description is most meagre.

2. ANTHOCEPHALUS, *A. Rich.*

A glabrous tree. *Leaves* petioled; stipules lanceolate, caducous. *Flowers* in terminal globose peduncled solitary heads, without bracteoles, united by their confluent calyx-tubes; peduncles with basal stipular bracts. *Calyx-limb* tubular, 5-lobed, persistent or deciduous. *Corolla-tube* long, funnel-shaped, throat glabrous; lobes 5, imbricate. *Stamens* on the throat of the corolla, filaments short. *Ovary* 4-celled above, 2-celled below; style exserted, stigma spindle-shaped; ovules very many, horizontal on 2 bifid placentas, which ascend from the septa below its middle, and send an arm into each of the 4 upper cells. *Fruits* confluent into a fleshy globose mass of many few-seeded coriaceous pyrenes. *Seeds* minute, testa rather thin: embryo clavate in fleshy albumen.

1. **A. Cadamba,** *Miq. Fl. Ind. Bat.* ii. 135; leaves elliptic-oblong ovate or ovate-cordate acute. *Bedd. Fl. Sylv.* 127, t. 35; *Brand. For. Fl.* 261. A. morindæfolia, *Korth. Verh. Nat. Gesch. Bot.* 154, t. 48. Nauclea Cadamba, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 512. Sarcocephalus Cadamba, *Kurz For. Fl.* ii. 63; *Wall. Cat.* 6088, *excl.* C.

From the HIMALAYA to CEYLON and MALACCA, wild or cultivated; Forests of PEGU, *Kurz*.—DISTRIB. Sumatra, Borneo.

A large tree; branches spreading. *Leaves* coriaceous, 5–9 in., shining above, pubescent beneath. *Heads* 1–2 in. diam., peduncles stout. *Flowers* orange-coloured with white stigmas, scented at night. *Fruit* as large as a small orange.—Wallich's 6088 C. a cultivated plant from Ava, is very different, having membranous leaves and very oblique nerves.

3. CEPHALANTHUS, *Linn.*

Shrubs or small trees. *Leaves* opposite or whorled; stipules short. *Flowers* densely crowded in terminal or axillary solitary simple or panicled globose heads mixed with setaceous or paleaceous bracteoles; peduncles with stipular caducous bracts about the middle. *Calyx-tube* obpyramidal; limb cup-shaped, 4–5-toothed or -lobed. *Corolla-tube* long, funnel-shaped; throat glabrous or hairy; lobes 4, imbricate. *Stamens* on the mouth of the corolla, filaments short; anthers 2-cuspidate at the base. *Ovary* 2-celled; style filiform, stigma capitate or clubbed; ovules 1 pendulous in each cell. *Fruit* of numerous obpyramidal indehiscent 1-seeded cocci. *Seeds* pendulous, with a fungoid aril, testa membranous sometimes winged; embryo in horny albumen, cotyledons flat.—DISTRIB. Species 6, tropical Asia, Africa, and America.

1. **C. naucleoides,** *DC. Prodr.* iv. 539; glabrous pubescent or tomentose, leaves ovate or ovate-lanceolate acuminate. *Kurz For. Fl.* ii. 68. C. aralioides, *Zoll. & Mor. Syst. Verh.* 61. Nauclea tetrandra, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 576; *Wall. Cat.* 6101.

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.* ASSAM, CACHAR, and SILHET.—DISTRIB. N. Birma, Java, China.

A small tree. *Leaves* opposite or 3–4-nate, 3–5 by 1–2 in.; petiole short; stipules acuminate, often gland-tipped. *Peduncles* often whorled, slender; bracteoles linear-clavate, hairy. *Heads* $\frac{3}{4}$ in. diam., yellowish-white. *Calyx-lobes* short, with interposed black glands. Very closely allied to the N. American *C. occidentalis*, Linn., and perhaps a form of it.

4. **ADINA,** *Salisb.*

Trees or shrubs. *Leaves* petioled; stipules large, caducous. *Flowers* bracteate or not, densely crowded in solitary or panicled globose heads: receptacle hairy. *Calyx-tube* angled, lobes 5. *Corolla* funnel-shaped, tube long, throat glabrous; lobes 5, valvate. *Stamens* 5, on the mouth of the corolla, filaments short. *Ovary* 2-celled; style filiform, stigma capitate or clubbed; ovules numerous, imbricated on a pendulous placenta in each cell. *Capsule* of 2 dehiscent cocci, many-seeded. *Seeds* oblong, testa winged; embryo in abundant fleshy albumen, radicle superior.—DISTRIB. Species 6, tropical Asiatic and American.

1. **A. cordifolia,** *Hook. f. in Gen. Pl.* ii. 30; leaves petioled orbicular cordate abruptly acuminate pubescent beneath, peduncles 1–3-axillary 1-headed. *Brand. For. Fl.* 263, t. 33. Nauclea cordifolia, *Willd.*; *Roxb. Hort. Beng.* 14; *Cor. Pl.* 1, t. 53; *Fl. Ind.* i. 514; *Wall. Cat.* 6092; *W. & A. Prodr.* 391; *Kurz For. Fl.* ii. 66; *Dalz. & Gibs. Bomb. Fl.* 118.

Dry forests, alt. 1–3000 ft., from KUMAON to SIKKIM, PEGU and TENASSERIM, and throughout the hilly parts of India to CEYLON.

A large or small tree, wood hard. *Leaves* deciduous, coriaceous, 4–12 in. diam.; petiole 2–3 in., stout; stipules orbicular or oblong. *Heads* $\frac{3}{4}$–1 in. diam.; peduncle stout, 1–2 in.; bracts small towards the apex. *Flowers* yellow; corolla downy; stigma clavate. *Capsule* $\frac{1}{6}$ in., cuneate, downy; cells about 6-seeded.

2. **A. sessilifolia,** *Hook. f. in Gen. Plant.* ii. 30; leaves sessile oblong glabrous base cordate tip rounded, peduncles 1–3 terminal solitary 1-headed, corolla shaggy. Nauclea sessilifolia, *Roxb. Fl. Ind.* i. 515; *Kurz For. Flor.* ii. 65. N. sericea, *Wall. Cat.* 6095; *G. Don Gen. Syst.* iii. 467.

CHITTAGONG, *Roxburgh*, &c. CACHAR, *Keenan*. PEGU, *Wallich*, &c.

A small tree. *Leaves* rather coriaceous, 6–10 by 3–6 in., glossy above; petiole very short and stout, stipules broadly oblong. *Heads* $1\frac{1}{2}$ in. diam., silkily villous; peduncle very stout, 1–2 in.; flowers shaggily silky; stigma clavate. *Capsules* $\frac{1}{3}$ in., cuneate.

3. **A. Griffithii,** *Hook. f.*; leaves shortly petioled elliptic oblong or obovate shortly obtusely acuminate glabrous, peduncles 1–2 terminal 1-headed, corolla glabrous.

KHASIA MTS.; Mahadeb, alt. 3000 ft., *Griffith, J. D. H.*, and *T. T.* ? NICOBAR Islands, *Kurz*.

A small quite glabrous tree. *Leaves* persistent, coriaceous, 4–7 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., narrowed into the short stout petiole; nerves 6–7 pair, prominent beneath, transverse ones slender; stipules not seen. *Peduncles* 1–2 in., very stout, smooth. *Heads* $1\frac{1}{4}$ in. diam.; bracteoles of short stiff conical-subulate spines shorter than the silky calyces and apparently persistent; corolla quite glabrous. The Nicobar specimen has rather

more flaccid and broader leaves than the Khasian, with 8–9 pairs of nerves, and a longer peduncle; its corollas have fallen away.

4. **A. polycephala,** *Benth. Fl. Hongkong,* 146; leaves shortly petioled lanceolate caudate-acuminate glabrous, heads in trichotomously branched panicles, corolla glabrous. Nauclea polycephala, *Wall. Cat.* 6100; *G. Don Gen. Syst.* iii. 467; *Kurz For. Fl.* ii. 65.

SILHET and KHASIA Mts., *De Silva, Griffith,* &c. CHITTAGONG, *J. D. H. & T. T.* TENASSERIM, *Kurz.* Moulmein on Thounggyun, alt. 4000 ft., *T. Lobb.*

A small evergreen tree. *Leaves* 3–5 by 1–1½ in., rather thin, glossy above; nerves 5–9 pair, caudate apex obtuse and variable in form and length, sometimes strap-shaped; petiole ½–¾ in.; stipules long. *Heads* ⅓ in. diam.; peduncles and pedicels slender, glabrous or puberulous. *Capsule* obovoid.

VAR. *macrophylla*; leaves broader 6–9 by 2½–4 in. oblanceolate with more numerous nerves (10–12 pairs) and much shorter tips. N. microcephala, *Wall. in Herb. Hook.* Cephalanthus aralioides, *Zoll. & Morr. Syst. Verz.* 61; *Miq. Fl. Ind. Bat.* ii. 152, 344. Nauclea trichotoma, *Zoll. & Morr. l.c.* N. aralioides, *Miq. l. c. Suppl.* 538.—Silhet, *Wallich*; Mergui, *Griffith.*—Sumatra and Java: probably the Silhet habitat is erroneous, the authority being a garden specimen.

5. STEPHEGYNE, *Korth.*

Shrubs or trees. *Leaves* petioled; stipules large, caducous. *Flowers* crowded in globose axillary and terminal solitary panicled or subumbelled heads united by their confluent calyx-tubes, each peduncle with 2 deformed leaves at the top, within which are 2 caducous bracts; bracteoles paleaceous. *Calyx-tube* short; limb cupular or tubular, truncate or 5-toothed. *Corolla* funnel-shaped, tube long, throat hairy or glabrous; lobes 5, short, valvate. *Stamens* 5, on the throat of the corolla, filaments short. *Ovary* 2-celled; style filiform, stigma capitate or mitriform; ovules imbricated upwards on pendulous placentas. *Fruit* of 2 dehiscent cocci, many-seeded. *Seeds* small, testa winged, albumen fleshy.—DISTRIB. Species 10, tropical African and Asiatic.

1. **S. parvifolia,** *Korth. in Verh. Gesch. Nat. Bot.* 161; leaves orbicular oblong ovate or cordate, tip rounded acute or acuminate, calyx-limb very short, corolla-tube much exceeding the lobes. *Brand. For. Fl.* 262. Nauclea parvifolia, *Willd.*; *Roxb. Hort. Beng.* 14; *Cor. Pl.* i. 40, t. 52; *Fl. Ind.* i. 513; *Wall. Cat.* 6093, *excl.* B. *partly*; *W. & A. Prodr.* 391; *Wt. Ill.* t. 123; *Bedd. Fl. Sylv.* t. 34. N. parviflora, *Pers.*; *Dalz. & Gibs. Bomb. Fl.* 118. Cephalanthus pilulifer, *Lamk.*

Dry forests of the TROPICAL HIMALAYA, from the Chenab to Birma, ascending to 4000 ft., and throughout the drier parts of India to CEYLON.

A small or large tree, glabrous or pubescent. *Leaves* extremely variable in size and shape, deciduous, 2–6 in., with 6–8 pair of oblique nerves; petiole short; stipules obovate. *Heads* about 1 in. diam., with 2 linear-oblong leaves at the base; bracts caducous; peduncles ½–3 in. *Corolla* glabrous within, stamens inserted in the tube. *Capsules* ⅛ in.

2. **S. tubulosa,** *Hook. f. in Gen. Pl.* ii. 31; leaves elliptic-oblong or ovate-cordate shortly acuminate, calyx-limb tubular truncate, corolla-tube much exceeding the lobes. *Bedd. Fl. Sylv., Anal. Gen.* 128, t. xxix. f. 1 (*excl. name parvifolia*). Nauclea tubulosa, *Arn. in Thwaites Enum.* 137; *Bedd. Ic. Pl. Ind. Or.* t. 18.

WESTERN PENINSULA; Cochin, *Johnson.* CEYLON, *Macrae,* &c.

A small glabrous tree. *Leaves* 2–6 in., rather membranous, sometimes pubescent beneath, variable in shape, rarely acute at both ends, sometimes cordate; nerves

10–12 pair; petiole ¼–1 in.; stipules large, obovate, membranous. *Peduncles* terminal, usually 3-nate with the middle ones very short or 0, the lateral 1–3 in.; bracted leaves petioled; bracts very caducous. *Heads* 1⅓ in. diam.; flowers glabrous; stigmas cylindric. truncate at both ends. *Capsules* ½ in. including the calyx, ribbed, nearly glabrous.

3. **S. diversifolia,** *Hook. f.*; leaves orbicular-cordate oblong or elliptic, tip rounded, calyx-limb 0, corolla-tube equalling the bearded lobes. N. diversifolia, *Wall. Cat.* 6096; *G. Don Gen. Syst.* iii. 467. N. parvifolia, *var.* 2, *Kurz For. Fl.* ii. 67. N. rotundifolia, *Roxb. Fl. Ind.* i. 516; *Kurz l. c.* N. Brunonis, *Wall. Cat.* 6097; *G. Don l. c.* 467.

CHITTAGONG, *Roxburgh*, &c. TENASSERIM and BIRMA, *Wallich*, &c.—DISTRIB. Philippines.

A small tree. *Leaves* deciduous, glabrous or pubescent beneath; the lower orbicular-cordate, 10 in. diam., coriaceous. the upper 4–6 by 2–3 in. and membranous, nerves oblique; petiole ¾–1½ in.; stipules obovate-oblong. *Heads* white in spreading 3-chotomous panicles, nearly 1 in. diam.; foliar bracts long-petioled; corolla glabrous except the lobes within; stigma elongate, mitriform. *Capsules* ¼ in. long, smooth, ribbed.—I have preferred Wallich's and Don's name of *diversifolia* to Roxburgh's of *rotundifolia*, as expressing the very remarkable difference between what I take to be the upper and lower leaves of the branches.

6. NAUCLEA, *Linn.*

Trees or shrubs. *Leaves* usually large, sessile or petioled; stipules large, caducous or subpersistent. *Flowers* crowded in globose peduncled bracteate solitary or subpanicled heads. *Calyx-tube* turbinate or obconic; lobes 5, usually tipped with valvate processes. *Corolla* elongate-funnel-shaped, throat glabrous; lobes short, imbricate. *Stamens* 5, on the throat of the corolla, filaments 0 or short or long. *Ovary* 2-celled; style filiform, stigma capitate cylindric or submitriform; ovules many, pendulous on adnate ascending placentas. *Fruit* of 2 dehiscent many-seeded cocci. *Seeds* imbricate, testa winged; embryo clavate in fleshy albumen.—DISTRIB. Species about 30, tropical Asiatic, and Polynesian.

* *Stigma capitate, stipules flat caducous.*

1. **N. purpurea,** *Roxb. Cor. Pl.* i. 41, t. 54; *Fl. Ind.* i. 515; leaves elliptic or elliptic-lanceolate subacute, heads 1–3 long peduncled, corolla glabrous. *Wall. Cat.* 6090, *excl.* D.; *W. & A. Prodr.* 391, *partly*; *Bedd. Fl. Sylv.* 129; *Ic. Pl. Ind. Or.* t. 19. N. lanceolata, *Blume Bijd.* 1009. Anthocephalus indicus, *Richd. in Mem. Soc. Hist. Nat. Paris*, v. 237. A. chinensis, *Hassk in Flora*, 1845, 231. Cephalanthus chinensis, *Lamk. Dict.* i. 678, *excl. syn. Rumph.*—*Rheede Hort. Malab.* iii. t. 33.

WESTERN PENINSULA; from the Concan to the Circars, and southwards, not common.

A small tree, quite glabrous. *Leaves* 4–8 by 1½–5 in., membranous, shining on both surfaces; petiole ½–1¼ in. *Heads* 1½ in. diam., paleæ of conical bristles; peduncles about 2–3 in., bracteate about the middle. *Calyx* silky.

2. **N. zeylanica,** *Hook. f.*; leaves elliptic or oblanceolate obtuse, peduncles 1–3 slender, corolla silky. N. peduncularis, *Thwaites Enum.* 137, *not of Wallich*; *Bedd. Fl. Sylv.* 129; *Ic. Pl. Ind. Or.* t. 235.

CEYLON; Saffragam and contiguous districts, ascending to 1000 ft. not uncommon; central province rare, *Gardner*, *Thwaites*.

A middle-sized tree. *Leaves* 4–5 by 1–2 in., opaque when dry, nerves 6–8 pair;

petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules linear-oblong. *Heads* $2\frac{1}{3}$ in. diam.; peduncles slender, 1–2 in., with 4 bracts below or above the middle. *Flowers* ochreous-purple; style rather short.

3. **N. peduncularis,** *Wall. Cat.* 609; leaves large elliptic or elliptic-oblong coriaceous obtusely acuminate, peduncles 3-nate very stout, corolla silky. *G. Don Gen. Syst.* iii. 469.

PENANG, *Porter.*—DISTRIB. Sumatra.

Branches very robust. *Leaves* 6–12 by 3–5 in., shining above, cordate or tapering into a very stout petiole $\frac{1}{2}$–1 in.; nerves strong beneath. *Peduncles* 1–$2\frac{1}{2}$ in., lateral spreading, central short or long. *Heads* $1\frac{1}{2}$ in. diam.; calyx-lobes long, slender, clavate, acuminate, very silky, longer than the tube of the glabrous corolla.

** *Stigma elongate acute, stipules concave sub-persistent.*

4. **N. missionis,** *Wall. Cat.* 6099; leaves elliptic-lanceolate acute or obtuse membranous glabrous, peduncles short stout solitary, calyx and corolla tomentose. *W. & A. Prodr.* 392; *Arn. Pugill. Pl. Ind. Or.* 20. N. oblongata, *Miq. in Herb. Hohenack.* 717. N. orientalis, *Herb. Madr.* N. elliptica, *Dalz. & Gibs. Bomb. Fl.* 118.

TRAVANCOR, *Rottler, Wight.* MALABAR, *Hohenacker.* CONCAN, *Stocks.*

Very similar to *N. purpurea*, but distinguished by the subsessile leaves of which the petioles are usually winged to the base, and the elongate stigma, and the remarkable stipules. *Leaves* 4–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., shining above; petiole rarely $\frac{1}{2}$ in.; nerves 10–12 pair, slender; stipules forming an appressed cylindric coriaceous sheath, more or less connate, sometimes half-way up, glabrous, obtuse, very persistent. *Peduncles* usually inclined, $\frac{2}{3}$–1 in., with stipular sheathing bracts at the base, and 4 small bracts united below into a cup above the base, of which 2 are shorter than the others. *Heads* $1\frac{1}{4}$ in. diam.; calyx-lobes and corolla-lobes tomentose.—Of Dalzell's *N. elliptica* there are authentic specimens, but in bud only. He describes the stigma as 'round,' but his specimens accord so entirely with Wight's, Rottler's, &c., in all other respects, that I suspect some mistake. His plant should be searched for 'near Sura, and the village of Hoolun, not far from Chorla Ghaut.'

5. **N. Maingayi,** *Hook. f.*; leaves broadly elliptic or elliptic-obovate coriaceous obtusely acuminate, nerves beneath pubescent, peduncles solitary very short, calyx and corolla-lobes tomentose.

MALACCA; *Maingay* (Kew Distrib. 823).

Branches stout, glabrous. *Leaves* 4–6 by 2–3 in., shining above, contracted into a short petiole which is almost winged to the base; nerves 12–14 pair, strong, spreading; stipules $\frac{2}{3}$ in. long, forming an appressed cylindric sheath, obtuse, coriaceous. *Peduncle* $\frac{1}{3}$ in., curved, with basal sheathing stipular bracts, and broad subpersistent ones under the head. *Head* $1\frac{1}{2}$ in. diam.—Very near to *N. missionis*, with similar remarkable stipules, but the leaves are much broader, very coriaceous, with more numerous more spreading strong nerves, which are pubescent beneath; the bracts under the head appear to be very large and orbicular, but they are much withered, and I have seen only 2 specimens.—A Bornean species (Beccari, *n.* 681) is probably the same as this, but the heads are larger.

DOUBTFUL SPECIES.

N. OVALIFOLIA, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 576; *Ed. Carey & Wall.* ii. 124; 'leaves sessile oval and elliptic, flowers terminal solitary.'—'Forests of Silhet': called Shal by the natives.—Possibly *Adina sessilifolia.* Don refers it to *Uncaria elliptica*, which is not a Khasian plant.

N. EXCELSA, *Blume*; *Kurz For. Fl.* ii. 65, from Pegu. This is certainly not Blume's plant, if Kurz is correct in describing it as having no bracteoles, and the

peduncles only 2–3 lines, for Blume's *N. excelsa* is a true *Adina* with slender cuneate bracteoles amongst the flowers, and peduncles sometimes 2 in.

N. ORIENTALIS, *Lamk. Ill.* t. 153, f. 1; *Blume Bijd.* 1066; *Ham. in Trans. Linn. Soc.* xv. 94, is altogether doubtful.

7. UNCARIA, *Schreb.*

Climbing shrubs. *Leaves* shortly petioled; stipules entire or 2-fid. *Flowers* in globose axillary peduncled solitary or panicled heads; peduncles often headless converted into hooked tendrils. *Calyx-tube* spindle-shaped; limb 5-lobed or -parted. *Corolla-tube* long, funnel-shaped; limb 5-lobed, valvate; throat glabrous. *Stamens* 5, on the throat of the corolla, filaments short; anthers with 2 basal bristles. *Ovary* 2-celled; style slender, stigma capitate; ovules many, ascending on projecting placentas. *Capsule* elongate, septicidally 2-valved, many-seeded. *Seeds* imbricating upwards, testa winged above and below; embryo clavate, in fleshy albumen.—DISTRIB. About 30 species, tropical Asiatic, except 1 African and 1 American. The Gambier of commerce is the produce of *U. Gambier.*

* *Calyx-limb long funnel- or bell-shaped, teeth lanceolate, corolla hirsute or villous.*

1. **U. sclerophylla,** *Roxb. Fl. Ind.* i. 520; branches robust obtusely 4-angled pubescent or villous, leaves short-petioled large ovate suborbicular or oblong rigid pubescent beneath shining and reticulate above, peduncles all axillary bracteate above the middle, heads very large, flowers pedicelled, corollas villous. U. sclerophylla, insignis, ferruginea, and pedicellata, *DC. Prodr.* iv. 347, 348. U. speciosa, *Wall. Cat.* 6106. U. ferruginea, *Kurz For. Fl.* ii. 69. Nauclea sclerophylla, *Hunter in Trans. Linn. Soc.* ix. 223. U. pedicellata, *Bl. Bijd.* 1012.

PENANG, *Hunter,* &c. MALAY PENINSULA, common from Pegu and Mergui to Malacca, *Wallich,* &c.—DISTRIB. Java, Borneo, Philippines.

Very large and stout. *Leaves* 5–6 by 3½–4 in., base rounded or cordate, rusty-pubescent beneath with strong transverse nerves between the 8 pairs of stout principal ones; petiole ¼–1 in.; stipules hairy, rounded, 2-fid. *Peduncle* very stout, 2–4 in.; bracts 6 in a whorl, ⅓ in. long. *Heads* 4 in. diam.; calyx tomentose, limb campanulate, lobes triangular acute; corolla 1 in., silky or densely villous all over. *Capsules* 1–1⅓ in., longer than their pedicels, very variable.—Stems shaggy with long hairs in a specimen from Penang (Maingay), with capsules shorter and more turgid, and leaves ovate very hairy beneath. The corollas vary from densely shaggy with spreading fulvous hairs, to silkily shaggy with appressed hairs.

2. **U. pedicellata,** *Roxb. Fl. Ind.* i. 520; *Ed. Wall. & Carey,* ii. 128; branches robust 4-angled, leaves short-petioled oblong ovate-oblong or elliptic shining above puberulous beneath rigid, peduncles axillary and in terminal panicles bracteate about the middle, flowers pedicelled, corolla ½–⅔ in. with long silky hairs. U. sclerophylla, *Wall. Cat.* 6105. U. ferruginea, *DC. Prodr.* iv. 348. U. Hallii, *Korth. Verh. Nat. Gesch. Bot.* 165, t. 33. Nauclea ferruginea, *Bl. Bijd.* 1013.

PENANG and SINGAPORE, *Wallich,* &c. MALACCA, *Griffith* (Kew Distrib. n. 2755). *Maingay* (Kew Distrib. n. 826).—DISTRIB. Java, Borneo.

Closely allied to *U. sclerophylla,* but smaller in all its parts, with more oblong leaves not so reticulate above and only minutely pubescent beneath; heads nearly as large, but flowers smaller and capsules much shorter and more turgid (as in one specimen of *sclerophylla*).

** *Calyx-limb small, funnel-shaped, limb with short teeth, corolla glabrous or pubescent (not shaggy).*

3. **U. attenuata,** *Korth. in Verh. Nat. Gesch. Bot.* 170, t. 34; branches 4-angled puberulous, leaves elliptic obtusely acuminate shining above puberulous beneath, flowers shortly pedicelled, calyx-teeth very short obtuse, corolla ⅓ in. silky, tube very slender. U. sclerophylla, *Deless. Ic. Select.* iii. t. 81, *not of Roxburgh.* U. Gambier, *Wall. Cat.* 6103 C. *in part.*

PENANG, *Phillips.* SINGAPORE, *Wallich.* TENASSERIM, *Helfer.*—DISTRIB. Sumatra.

Branches nearly glabrous. *Leaves* 4–6 by 2–3½ in., firm, base rounded; petiole ½–¾ in.; nerves about 8 pair, very obliquely ascending, strong, with transverse veins, axils with tufts of hair. *Peduncles* 1–2 in. *Heads* 1½ in. diam.; pedicels very short, elongating to ⅓ in, in fruit and calyx rufous-tomentose. *Capsules* (unripe) ¾ in.

4. **U. ovata,** *Br. in Wall. Cat.* 6112, *in part*; 6103 D. (*U. Gambier*) and 6107 *in part* (*U. macrophylla*); branches glabrous, leaves petioled oblong obtusely acuminate glabrous and ashy beneath, peduncles long stout straight axillary and in terminal panicles bracteate above the middle, flowers sessile, calyx-lobes ovate acute, corolla silky.

SINGAPORE, SILHET, and 'HB. FINLAYSON,' *Wallich.*

Foliage identical with that of *U. canescens*, Korth., but nerves usually 8 pair, always without tufts of hairs in the axils; and the peduncles long and stout, 1½–2 in., with the bract-scar ½ in. below the head, and the silky calyx-lobes ovate and acute; the heads also are larger, and the corollas more silky. It differs from a Philippine Island plant of Cuming (n. 1470, 1503) in the calyx-lobes very short and ovate, not linear or subclavate. Of Wallich's Herbarium specimens (the only ones I have seen) one is from Singapore, on sheet 6112, with *U. Gambier*; another is on a sheet by itself, marked '6103 D. U. Gambier, Herb. Finlayson' (probably from Siam, where Finlayson collected); the third, also on a sheet by itself, is marked '6107. U. sessilifolia, *Roxb. Ic. pict.* Sylhet.' The latter is probably an erroneous habitat. There is a very similar plant in Maingay's herbarium from Penang (U. sclerophylla, Kew Distrib. 828), with the leaves slightly scabrid beneath.

5. **U. canescens,** *Korth. Verh. Nat. Gesch. Bot.* 172; branches glabrous or puberulous, leaves petioled oblong obtusely caudate-acuminate glabrous ashy beneath, peduncles very short bracteate near the base, calyx densely tomentose lobes rounded, corolla pubescent.

MALACCA or PENANG, *Maingay* (Kew Distrib. 1768, *in part*).

I have very imperfect specimens of this mixed with *U. ovata*, Br.; they precisely accord with others from Sumatra, collected by Korthals. These differ from all described species by the glabrous foliage, glaucous beneath, together with the very short curved peduncles, bracteate towards the base. *Leaves* 4–6 by 1½–2¾ in., rather membranous; nerves slender, 7 pair; petiole ½–¾ in. *Peduncle* ½ in., decurved; bracts ovate, acute, pubescent. *Heads* 1¼ in. diam.; flowers at first sessile, pedicelled later.—Identical in foliage with *ovata*, Br., and a Philippine Island species (*Cuming*, 1470, 1503), differing in the peduncle and calyx from both.

6. **U. pteropoda,** *Miq. Fl. Ind. Bot.* ii. 343; branches 4-angled glabrous, leaves large very coriaceous very broadly elliptic or ovate obtuse narrowed into the short winged petiole quite glabrous, peduncles short stout all axillary bracteate above the middle, heads large, flowers sessile, calyx-teeth obtuse.

PENANG, *Phillips.* MALACCA, *Maingay* (Kew Distrib. n. 829).—DISTRIB. Sumatra, Borneo.

A very distinct species (the Indian specimens are in fruit only) of a pale colour. *Branches* rather slender. *Leaves* 6–8 by 4–5 in., not shining above or beneath, point suddenly contracted but obtuse; nerves 6 or 7 pair, very strong beneath, arched,

veins very slender. *Peduncles* ½–1 in. *Fruiting heads* 3–4 in. diam. *Capsules* ⅝–1 in., on pedicels as long or longer, crowned with a very small almost cupular calyx-limb.—Bornean specimens have silky corollas.

7. **U. sessilifructus,** *Roxb. Fl. Ind.* i. 520; branches slender 4-angled glabrous, leaves elliptic obtuse or obtusely acuminate shining above glabrous and rather glaucous beneath, nerves 5 pair, peduncles axillary and in terminal panicles bracteate in the middle, corolla-tubes glabrous lobes silky or glabrous, capsules sessile. *Wall. Cat.* 6109; *Kurz For. Fl.* ii. 71. Nauclea scandens, *Roxb. mss. Ic. pict.* No. 1218.

Eastern Bengal, from SIKKIM and the KHASIA Mts. to CHITTAGONG, PEGU, and TENASSERIM.

Branches rather acutely angled. *Leaves* very uniform, pale-coloured, 4–4½ by 2–2½ in., coriaceous, smooth on both surfaces, tip sometimes produced; nerves often with tufts of hairs in the axils, very oblique, veins obscure; petiole ¼ in.; stipules 2-partite. *Peduncles* 1–1½ in., slender, often forming terminal panicles, puberulous; bracts 4, subulate, subequal. *Heads* 1 in. diam.; fruiting not much larger. *Calyx-lobes* small, rounded; corolla-tube slender, lobes glabrous in Griffith's Khasian specimens, silky in Wallich's. *Capsules* turgid, ⅓ in. long, pubescent. I follow Wallich in accepting this as Roxburgh's *R. sessilifructus*, though the leaves are not as described in the Flora Indica, 'soft underneath.' The stipules appear 2-partite, but are not perfect.

8. **U. lævigata,** *Wall. Cat.* 6111; branches 4-angled glabrous, leaves elliptic-lanceolate glabrous on both surfaces shining above not glaucous beneath, nerves 5–6 pair slender, stipules 2-fid, peduncles axillary and in terminal panicles bracteate about the middle, bracts short obtuse, calyx obscurely toothed, corolla glabrous, capsules sessile.

TENASSERIM and PEGU, *Wallich, Falconer, Kurz*; KHASIA MTS., *Griffith* (Kew Distrib. 2769).

Very near *U. sessilifructus*, but the leaves are not at all glaucous beneath, the bracts broad and obtuse, and the corolla perfectly glabrous.

9. **U. homomalla,** *Miq. Fl. Ind. Bat.* ii. 343; branches tomentose or puberulous, leaves ovate-lanceolate long acuminate opaque and puberulous above especially on the nerves, shortly hairy beneath, nerves 6–8 pair, veins remote, stipules 2-partite, peduncles all axillary bracteate above the middle, flowers sessile, calyx-limb very short obscurely toothed, ovary minute cuneate silky, corolla pubescent. U. pilosa, *Wall. Cat.* 6108 C., *not of Roxburgh.*

EASTERN BENGAL; Jyntea hills, *Wallich.*—DISTRIB. Sumatra.

Branches lower acutely 4-angled, upper nearly terete, closely finely pubescent. *Leaves* 2½–3½ by 1–1½, gradually tapering to the long points, base rounded; petiole slender, ⅓ in.; stipules each divided into 2 subulate-lanceolate recurved subpersistent segments. *Peduncles* stout, 1 in., tapering from the base; bracts obtuse. *Heads* ¾ in. diam.; receptacle small; corolla ⅓ in. long. *Capsules* probably sessile.—Differs entirely from Roxburgh's *U. pilosa* in the fine pubescence, smaller size, petioled leaves, and calyx-teeth.

10. **U. ovalifolia,** *Roxb. in Wall. Cat. under* 6103 B. C. (*U. Gambier*); branches slender glabrous, leaves broadly elliptic-ovate or orbicular obtusely acuminate membranous opaque concolorous and quite glabrous on both surfaces, wrinkled when dry, stipules 2-fid, peduncles short slender all axillary bracteate near the base, flowers pedicelled, calyx-lobes small round, corollas small uniformly pubescent, capsules very slender. ? U. ovalifolia, *Roxb. Fl. Ind.* i. 129.

PENANG. *Porter.* SINGAPORE, *Wallich, T. Anderson.* MALACCA, *Griffith* (Kew Distrib. 2758, 2759, an abnormal state), *Cuming* (*n.* 2292).

Branches slender. *Leaves* 2–3 by 1½–2½ in., red-brown and quite opaque when dry; nerves about 5 pair, very slender; petiole slender. base rounded, rarely subcordate. *Peduncles* ½–1 in., slender, pubescent; bracts orbicular. *Heads* ¾ in. diam.; calyx villous, lobes very distinct and almost orbicular; corolla ⅓ in., very slender. *Capsules* ½–⅔ in., twice as long as the filiform pedicels, rusty-puberulous.—A very distinct species, easily recognised by the broad thin quite glabrous wrinkled (when dry) leaves with faint nerves, the 2-fid stipules, small flowers, calyx, and very slender capsules. It is one of the 6 species included under Wallich's *U. Gambier* (*n.* 6103), and under letter B. is called '*U. Gambier* et *U. ovalifolia. Roxb. Hb.* 1824.' I do not find the peduncles to be 'axillary and terminal, compound.' as described by Roxburgh.

11. **U. dasyoneura,** *Korth. Verh. Nat. Gesch. Bot.* 169; branches 4-angled glabrous, leaves elliptic obtusely acuminate narrowed into the rather long petiole shining above, nerves 4–5 pair strong with scattered hairs beneath, stipules entire, peduncles short all axillary bracteate about the middle, flowers subsessile, calyx shortly 5-toothed, corolla puberulous. *Miq. Fl. Ind. Bat.* ii. 143. U. elliptica, *Br. in Wall. Cat.* 6104, A. *in part*, B.

PENANG, *Porter, Phillips.* MALACCA, *Griffith* (Kew Distrib. 2756, *U. brevispina* ?), *Maingay* (Kew Distrib. 827/2, *U. acida*). SINGAPORE, *Lobb* (No. 331).

Leaves very uniform, 3–3½ by 2–2½ in., coriaceous, dark brown, veins very faint beneath; petiole ¾ in. *Peduncles* generally shorter than the petioles; bracts ovate-lanceolate, glabrous. *Heads* 1 in. diam.; calyx shortly tomentose, limb a small very shortly toothed cup; corollas slender. *Capsules* slender, 1 in., on filiform pedicels.—There are three plants under Wallich's 6104 A., of which this is the principal; No. 6104 B., from Herb. Finlayson (probably from Siam), has rather more obovate leaves.

VAR. *Thwaitesii*; leaves sometimes almost glabrous beneath, flowers and fruit more tomentose and ferruginous. U. Gambier, *Thwaites Enum.* 138, *not of Roxburgh.*—Ceylon; at Colombo, &c., in the central provinces, alt. 3000 ft.

*** *Calyx-tube very short, lobes oblong or linear or filiform, corolla glabrous or pubescent.*

12. **U. Gambier,** *Roxb. Fl. Ind.* i. 517; leaves ovate or ovate-lanceolate obtusely subcaudate or acuminate glabrous on both surfaces, base rounded or acute not glaucous beneath, nerves 5 pair, peduncles all axillary bracteate in the middle flowers pedicelled, calyx-lobes oblong, corolla-tube puberulous lobes white silky externally and with a white beard within. *Korth. Verh. Nat. Gesch. Bot.* t. 34; *Wall. Cat.* 6103, A. E. C. *in part*, and 6107 (*U. macrophylla*) *in part*; *Hayne Arzn. Gesch.* x. t. 3. ? Nauclea Gambier, *Hunter in Trans. Linn. Soc.* ix. 218, t. 22; *Fleming in Asiat. Researches*, xi. 187.

HAB. MALACCA, PENANG, and SINGAPORE (wild or cultivated).—DISTRIB. Java, Sumatra.

It is impossible to pronounce, from the descriptions of Rumph and Hunter, what they intended by their 'Gambier.' I have assumed that Roxburgh's is the right plant, both from his accuracy, and because I find that Maingay's specimens marked as 'the cultivated plant of commerce' agree both with Roxburgh's description and with the specimen in Wallich's Herbarium (6103 A.), which bears Roxburgh's ticket of *Gambier*. Its characters are, in addition to those given above, leaves coriaceous, 4–5 by 2–2½ in., always glabrous beneath except small tufts of hairs in the nerve-axils, hardly shining above; stipules entire; peduncles rarely more than an inch long; heads 1½ in. diam.; calyces tomentose; corollas ½ in. long with the orbicular white silky lobes contrasting strongly when dry with the dark tube, the lobes inside bearded towards the base with white hairs (rarely absent); and glabrous fusiform capsules ⅔ in. long on short pedicels. The tuft of white hairs on the corolla-lobes is not represented in Roxburgh's Icones, though described by him.

13. **U. jasminiflora,** *Wall. Cat.* 6103 C. F.; branches glabrous or puberulous, leaves elliptic obtusely acuminate glabrous base acute coriaceous, nerves 4–5 pair very slender, peduncles all axillary bracteate about the middle, flowers shortly pedicelled, calyx tomentose, lobes linear-oblong longer than the tube, corolla pubescent, capsules pedicelled almost glabrous.

MALACCA, *Griffith* (Kew Distrib. 2766), *Maingay* (Kew Distrib. 832). SINGAPORE, *T. Anderson*; Hb. Finlayson, *Wallich.*

A very distinct species, well-marked by the elliptic perfectly glabrous leaves narrowed into the petiole, and the linear-oblong calyx-lobes. I have seen neither stipules nor bracts.—*Leaves* 2–3 by 1½–2 in., somewhat shining above, opaque beneath, veins very inconspicuous; petiole slender, ¾ in. *Heads* 1½ in. diam. *Capsules* turgid, ½ in., on very slender pedicels.—Maingay's specimens are very pale coloured.

14. **U. pilosa,** *Roxb. Fl. Ind.* i. 520; branches peduncles and leaves beneath tomentose with short hairs, leaves short-petioled oblong-ovate abruptly caudate-acuminate, above pilose or scaberulous and pubescent on the 8–10 pair of nerves, stipules 2-partite, peduncles all axillary very stout bracteate above the middle, calyx-lobes linear obtuse, corolla hairy, capsules obtuse sessile. *Wall. Cat.* 6108 A. B. Nauclea scandens, *Smith in Rees. Cyclop.*

TROPICAL HIMALAYA, alt. 1–2500 ft. from GARWHAL to SIKKIM. KHASIA MTS., *J. D. H. & T. T.* CHITTAGONG, *Roxburgh, J. D. H. & T. T.* BIRMA, *Griffith* (Kew Distrib. 2760); PEGU and TENASSERIM, *Kurz.*

A stout hairy species. *Leaves* 4–6 by 2–2½ in., rather membranous, greenish when dry, base rounded; nerves rather delicate, veins distinct; petiole ⅛ in.; stipule-segments lanceolate recurved. *Peduncles* stout, 1–3 in., tapering from the base; bracts on the upper ⅔, about 6 in a whorl, linear-lanceolate. *Heads* 1⅓ in. diam.; calyx-lobes equalling the tube, sometimes clavate, corolla-tube very slender. *Capsules* ⅓ in., quite sessile, clavate, tipped by the long calyx-lobes, nearly glabrous.

15. **U. Roxburghiana,** *Korth. in Verh. Nat. Gesch. Bot.* 172; branches terete, peduncles and leaves on both surfaces strigose scabrid or hispid, leaves short-petioled ovate finely acuminate rigid, stipules 2-partite glabrous, peduncles short stout all axillary bracteate at the top, calyx-lobes linear-subulate, corolla glabrous, capsules sessile small.

MALACCA, *Maingay* (Kew Distrib. 831). SINGAPORE, *T. Anderson.* DISTRIB. Sumatra.

A stiff scabrid species. *Leaves* 2½–3 by 1–1¾ in., rigid, paler beneath; nerves 5 pair, very stout, spreading; petiole ⅛ in.; stipules large, broad, coriaceous, concave, subpersistent. *Peduncles* ½–1 in., tapering from the base; bracts close to the head, oblong, obtuse. *Capsules* ¼ in., quite sessile, strigose.

16. **U. macrophylla,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 132; *Cat.* 6107, *in part*; branches stout, leaves beneath and stout peduncles finely rusty-tomentose, leaves short-petioled broadly elliptic or elliptic-obovate or oblong acuminate above glabrous except on the 6 pair of nerves, stipules 2-partite, peduncles axillary and terminal bracteate near the top, calyx-teeth linear, corolla pubescent, capsules pedicelled. U. sessilifolia, *Roxb. mss. in Wall. Cat.*

BHOTAN and ASSAM, *Griffith* (Kew Distrib. 2763). KHASIA MTS., alt. 0–4000 ft., common. CACHAR, *Keenan.*

A large stout species. *Leaves* 5–7 by 2½–4 in., rather coriaceous, opaque above, base cordate or rounded; nerves rather stout, oblique, not strongly curved; petiole ⅛ in., stout; stipules small, segments ovate-lanceolate, pubescent. *Peduncles* 1½–2½ in.; bracts near the head, 6 in a whorl, lanceolate, densely tomentose. *Heads* 1⅓ in. diam., fruiting 3½ in. diam.; flowers subsessile, tomentose; calyx-lobes equalling the

tube, narrow; corolla-lobes whiter than the tube. *Capsules* very numerous, 3¼ in., fusiform, beaked, shorter than the slender pedicels, nearly glabrous.—One sheet of Wallich's 6107 is *U. Gambier*, Roxb., another is *U. ovata*.

17. **U. lanosa,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 131; *Cat.* 6110; branches subterete hairy, leaves very short-petioled ovate-lanceolate finely acuminate slightly hairy above softly so beneath, stipules 2-partite, peduncles all axillary short bracteate in the middle, calyx-lobes long linear, capsules long-pedicelled glabrous. Nauclea lanosa, *Poir. Dict. Suppl.* iv. 64. N. setigera, *Blume Bijd.* 1013.

PENANG, *Wallich, Phillips.*—DISTRIB. Sumatra, Malay Islands.

Slender. *Leaves* 3–4 by 1½–2 in., membranous, yellow-brown, opaque above when dry with scattered hairs or glabrate, paler beneath with soft appressed hairs, base acute or rounded; nerves 6 pair, very distinct, obliquely arching, transverse nerves very slender; petiole ⅙ in.; stipular segments ovate-oblong, recurved, quite glabrous. *Peduncles* ½–¾ in., narrowed from the base; bracts 4, slender, recurved. *Heads* ⅔ in. diam., in fruit 2 in.; receptacle very small and pedicels slightly hairy; calyx-lobes longer than the tube. *Capsules* fusiform, ⅓ in., glabrous, on filiform pedicels twice their length, acute, hardly beaked.—I have seen no corollas. Wallich describes the tube as capillary, smooth, and the lobes as a little hairy.

18. **U. Lobbii,** *Hook. f.*; branches subterete glabrous, leaves short-petioled elliptic-ovate abruptly obtusely acuminate glabrous membranous, nerves 7 pair, stipules 2-fid, peduncles all axillary bracteate above the middle, calyx villous, lobes linear longer than the tube, corolla-tube glabrous, lobes pubescent.

SINGAPORE, *Lobb* (n. 332).

Slender, very glabrous. *Leaves* 3–3½ by 1½–1¾ in., green when dry, shining above, almost so beneath; nerves slender, arching upwards, with minute axillary tufts and a few scattered hairs; petiole slender, ⅙ in.; stipules membranous, reflexed. *Peduncles* narrowed from the base, shining; bracts 6, large, ovate, acuminate, membranous, reflexed. *Heads* 1 in.; flowers sessile.

19. **U. ferrea,** *DC. Prodr.* iv. 348; branches subterete, peduncles and petioles and leaves beneath densely tomentose or villous, leaves short-petioled ovate or elliptic-ovate obtusely acuminate with scattered hairs and tomentose on the 8–9 pair of nerves above, stipules 2-fid and large bracts tomentose, peduncles all axillary bracteate above the middle, calyx hirsute, lobes very long filiform, corolla glabrous, capsules slender long-pedicelled. Nauclea ferrea, *Blume Bijd.* 1014.

MALAY PENINSULA, from Mergui, *Griffith* (Kew Distrib. 2762), *Helfer* (Kew Distrib. 2761), to MALACCA, *Maingay* (Kew Distrib. 830).—DISTRIB. Sumatra, Java, Borneo.

Rather robust and very hairy. *Leaves* 3–4½ by 2–2½ in., rather coriaceous, rusty-brown above when dry, paler beneath, base rounded, nerves strong spreading, transverse ones distinct; petiole ⅙ in.; stipules broad, recurved. *Peduncles* 1–1¼ in., narrowed upwards; bracts 4–6, nearly ½ in., ovate, acuminate. *Heads* 2 in. diam., fruiting not much larger; flowers subsessile; calyx-tube much shorter than the lobes. *Capsules* ½ in., fusiform, shorter than the pedicels, acuminate, hairy.—*U. Horsfieldiana*, Miq., is a variety with leaves less hairy beneath. Cuming's 1128, from the Philippines, is a closely allied species with much smaller bracts and stipules.

DOUBTFUL SPECIES.

U. ACIDA, *Roxb. Fl. Ind.* i. 520. Nauclea acida, *Hunter in Trans. Linn. Soc.* ix. 223. It is impossible from Hunter's or Roxburgh's descriptions to say to what

species this name applies; it is a native of Penang, and stated to have acid foliage. Wallich does not include it in his Catalogue. Miquel (*Fl. Ind. Bat.* ii. 145) records it as a native of Sumatra, Java, Borneo, and the Moluccas, and from his allusion to its often monstrous state from Borneo he probably refers to it the *U. ovalifolia*.

U. CIRRHIFLORA, *Roxb. Fl. Ind.* i. 520, doubtfully referred in *Fl. Ind., ed. Carey & Wall.* ii. 129 to *U. pedicellata*, is not determinable.

TRIBE II. **CINCHONEÆ.**

8. **HYMENOPOGON,** *Wall.*

An epiphytic undershrub. *Leaves* petioled, deciduous; stipules large, persistent, with fleshy axillary bristles. *Flowers* rather large, corymbose, white; corymbs with large white leafy reticulated bracts. *Calyx-lobes* elongate, persistent. *Corolla-tube* long, limb salver-shaped, throat with reflexed hairs; lobes 5, valvate in bud. *Stamens* 5, inserted below the throat, filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, 2-grooved, stigmas 2 linear; ovules many, subulate, imbricate on peltate placentas. *Capsule* crowned with the calyx, septicidally 2-valved, many-seeded. *Seeds* imbricate, linear, with long tails at each end, hilum lateral; embryo minute in copious albumen.—DISTRIB. 2 Indian species.

1. **H. parasiticus,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 157; *Pl. As. Rar.* iii. t. 227; *Cat.* 6113; leaves elliptic-lanceolate or oblanceolate acuminate, corymbs shorter than the leaves, flowers pedicelled, corolla-lobes villous. *Kurz For. Fl.* ii. 73. Mussænda cuneifolia, *Don Prodr.* 139.

TEMPERATE HIMALAYA, from Kumaon to Bhotan, alt. 6–8000 ft., *Wallich*, &c. KHASIA MTS., alt. 4–6000 ft. PEGU, alt. 3000 ft., *Kurz*.

A small straggling often epiphytic shrub. *Stem* curved, rooting, shoots villous. *Leaves* at the ends of the branches, 3–12 by 2–4 in., membranous, narrowed into the short petiole, midrib broad, nerves about 20 pair; stipules ovate, acute. *Corymbs* 3-chotomous; peduncle 2–3 in.; bracts at the axils stipule-like, those at the pedicels foliaceous, long-petioled, 3–4 in. long, narrow oblong, obtuse or acute, finely reticulated. *Calyx-lobes* linear. *Corolla* 1½ in. *Capsule* membranous, turbinate.

2. **H. assamicus,** *Hook. f.*; leaves elliptic-lanceolate finely acuminate, corymbs longer than the leaves, flowers subsessile, corolla-lobes glabrous.

ASSAM, *Masters* (*Herb. Hort. Bot. Calc.*).

Stem as in *H. parasiticus*. *Leaves* 5–10 by 2–2½ in., subfalcate, narrowed into the shorter pubescent petiole, glabrous, midrib slender, nerves 30–40 pair; stipules ovate, acuminate. *Peduncle* slender, 5 in., with the rachis 8 in.; branches long, slender; bracts at the axils whorled, ovate, acute, at the pedicels petioled foliaceous lanceolate acute. *Calyx-lobes* broadly ovate. *Corolla* ¾ in.

9. **COPTOSAPELTA,** *Korth.*

Climbing tomentose shrubs. *Leaves* coriaceous; stipules small, triangular, deciduous. *Flowers* in terminal pendulous panicles, buds angular. *Calyx-tube* turbinate or subglobose; teeth 5, short, persistent. *Corolla* coriaceous, tube very short; lobes 5, linear, twisted in bud. *Stamens* 5, on the throat of the corolla; filaments short, subulate; anthers elongate, 2-fid at the base, back hairy. *Ovary* 2–3-celled; style short; stigma long fusiform, with 4 pubescent angles; ovules many, ascending, placentas on the septum. *Capsule* 2–3-celled,

loculicidally 2–3-valved. *Seeds* many, peltate, imbricate, winged; embryo straight in fleshy albumen.—Distrib. Species 4, all Malayan.

1. **C. flavescens,** *Korth. in Ned. Kruidk. Arch.* ii. 113; branches inflorescence and leaves beneath softly tomentose or glabrate, leaves elliptic acuminate, calyx-limb short small, corolla tube silky lobes glabrous. Stylocoryne macrophylla, *Wall. Cat.* 8405, *excl. syn.* Webera macrophylla, *Roxb.*

Malayan Peninsula, from Tenasserim to Singapore and Penang, *Porter*, *Griffith* (Kew Distrib. 2708), *Maingay* (Kew Distrib. 908).—Distrib. Sumatra, Java, Borneo.

A shrub, branches terete. *Leaves* coriaceous, 3–4 by 2 in., shining above, green when dry, nerves 3 or 4 pair prominent beneath; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Flowers* 1 in. diam., fragrant. *Calyx-limb* short, lobes oblong. *Corolla-tube* $\frac{1}{4}$ in.; lobes twice as long, linear, obtuse. *Capsule* $\frac{1}{3}$ in. diam.

2. **C. Griffithii,** *Hook. f. Ic. Pl.* t. 1089; branches inflorescence and leaves beneath softly tomentose or glabrate, leaves elliptic or orbicular acuminate, calyx-limb cupular, corolla-tube and lobes silky.

Malacca and Singapore, *Griffith* (Kew Distrib. 2789), *Maingay* (Kew Distrib. 907).

Very similar to *C. flavescens* in foliage, but more tomentose, calyx-limb larger almost inflated, corolla-tube shorter and much broader, and together with the lobes very silky; fruit and seeds all larger.

10. HYMENODICTYON, *Wall.*

Trees or shrubs with thick branches and bitter bark. *Leaves* petioled, deciduous; stipules deciduous. *Flowers* small, spicate; spikes in axillary and terminal nodding panicles with 1 or 2 large leafy reticulate persistent bracts. *Calyx-tube* short; lobes 5–6, ovate or subulate, deciduous. *Corolla* funnel- or bell-shaped, glabrous within; lobes 5, short, valvate in bud with everted margins. *Stamens* 5, inserted below the throat, filaments short dilated upwards; anthers linear. *Ovary* 2-celled; style filiform, stigma spindle-shaped; ovules numerous, on cylindric placentas adnate to the septum. *Capsule* loculicidally 2-valved, many-seeded; placentas at length free. *Seeds* imbricating upwards, testa broadly winged; embryo small, in fleshy albumen.—Distrib. Species 4–5 tropical Asiatic and African.

1. **H. excelsum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 149; leaves ovate elliptic or almost orbicular abruptly acuminate finely pubescent on both surfaces, stipules subentire, panicles large spreading compound. *W. & A. Prodr.* 392; *Wt. Ic.* t. 79; *Dalz. & Gibs. Bomb. Fl.* 117; *Brand. For. Fl.* 267. H. thyrsiflorum, *Wall. l. c.* 151; *Cat.* 6114 and 6115 D. (*flaccidum*); *Kurz For. Fl.* ii. 72. H. utile, *Wight Ic.* t. 1159 (*letterpress*); *Bedd. Fl. Sylv.* 130, t. 219, A. *only*. H. obovatum, *Wt. Ic.* t. 80 (*copied from Roxburgh*). H. Horsfieldianum, *Miq. Fl. Ind. Bat.* ii. 154. Cinchona excelsa, *Roxb. Cor. Pl.* t. 106; *Fl. Ind.* i. 529. C. thyrsiflora, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 530.

Dry hills, base of the Western Himalaya from Garwhal to Nepal, ascending to 2500 ft., throughout the Deccan and Central India to the Annamallays; and in Tenasserim and Chittagong.—Distrib. Java.

A deciduous tree, 30–40 ft., with smooth bark. *Leaves* 4–10 by 3–5 in.; mem-

branous, narrowed into a petiole 1–3 in., nerves 7–10 pair; stipules broad, recurved, usually glandular-serrate. *Panicles* large, pubescent often drooping; floral leaves long-petioled, 3–5 in., strongly nerved. *Flowers* small, white, pedicelled, clustered. *Calyx* $\frac{1}{12}$ in. *Corolla* $\frac{1}{6}$ in. *Capsules* on thick decurved pedicels, $\frac{2}{3}$ in. long, ellipsoid.

2. **H. flaccidum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 152; *Cat.* 6115 A. C.; *Tent. Fl. Nap.* t. 22; *Pl. As. Rar.* ii. 81, t. 188; leaves elliptic abruptly acuminate glabrous or puberulous only on the nerves beneath, racemes spiciform nearly simple, capsules deflexed. *Brand. For. Fl.* 268.

TEMPERATE HIMALAYA, alt. 3–6000 ft., from Garwhal to Bhotan frequent. KHASIA MTS., alt. 4–5000 ft.

A deciduous tree, with ashy bark, young often epiphytic. *Leaves* 5–8 by 3–6 in., narrowed into the petiole of 1–4 in., nerves 7–8 pair; stipules broadly obovate oblanceolate or ovate, glandular-serrate. *Racemes* 4–10 in., pubescent, curved, dense-flowered; peduncle 1–3 in.; floral bracts as in *H. excelsum*, white, convex. *Flowers* subsessile, white. *Calyx* $\frac{1}{12}$ in. *Corolla* about twice as long. *Capsules* $\frac{1}{2}$ in. long, ellipsoid.

3. **H. obovatum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 153; *Cat.* 6116; leaves elliptic or broadly obovate abruptly acuminate glabrous or pubescent beneath, racemes spiciform, capsules erect. *W. & A. Prodr.* 392; *Wt. Ic.* t. 1159; *Dalz. & Gibs. Bomb. Fl.* 117; *Bedd. Fl. Sylv.* t. 219; *Brand. For. Fl.* 268.

WESTERN PENINSULA, from Bombay to Travancore, on the Ghauts, frequent.

In its extreme form, with broadly obovate leaves, from the southern part of the Peninsula, this looks very different from *H. flaccidum*; but specimens from the Concan almost unite them; but both specimens from the Bababoodan hills, with elliptic leaves, and Wight's figured from Coimbatore, with broadly obovate ones, have erect capsules, which I have not observed in any specimen of *H. flaccidum*. The differences in the length, &c., of the anthers and filaments are probably sexual.

11. LUCULIA, *Sweet.*

Shrubs. *Leaves* petioled; stipules cuspidate, deciduous. *Flowers* rosy or white, in terminal many-fld. corymbs, odorous; bracteoles deciduous. *Calyx-lobes* 5, elongate, unequal, linear-oblong, deciduous. *Corolla* salver-shaped, tube long; lobes 5, simple or with 2 calli at the base, imbricate in bud. *Stamens* 5, in the tube of the corolla, filaments very short; anthers linear. *Ovary* 2-celled; style slender, stigmas 2 linear included; ovules many, on 2 revolute longitudinal placentas in each cell. *Capsule* almost woody, septicidally 2-valved, many-seeded. *Seeds* minute, imbricate upwards, testa rough winged toothed; embryo minute in fleshy albumen.—DISTRIB. 2 Indian species.

1. **L. gratissima,** *Sweet Brit. Fl. Gard.* t. 145; leaves oblanceolate lanceolate or elliptic-lanceolate acuminate, nerves usually spreading, inflorescence pubescent, corolla-lobes without interposed tubercles. *Kurz For. Fl.* ii. 71; *Hook. Bot. Mag.* 3946. Cinchona gratissima, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 154; *Tent. Fl. Nap.* t. 21; *Cat.* 6117 A. Mussænda Luculia, *Ham. in Don Prodr.* 139.

TEMPERATE HIMALAYA, from Nipal to Bhotan, not frequent, alt. 4–6000 ft., *Wallich*, &c.—DISTRIB. Ava (*Kurz*).

A spreading shrub, 10–16 ft.; branches lenticellate. *Leaves* membranous or coriaceous, 6–9 by 2–4 in., very variable in breadth, sometimes pubescent beneath, acuminate, narrowed into the petiole; nerves 9–12 pair. *Corymbs* sometimes 8 in. diam., very many flowered; flowers 3-nate, pink, shortly pedicelled. *Calyx-tube* $\frac{1}{4}$ in.,

limb twice as long, glabrous or pubescent. *Corolla-tube* 1-$1\frac{1}{2}$ in., lobes $1\frac{1}{2}$ in. across. *Capsule* $\frac{1}{3}$-$\frac{1}{2}$ in., obovoid, apparently very variable; in Nipal specimens obovoid $\frac{1}{2}$ by $\frac{1}{3}$ in., in Bhotan ones $\frac{3}{4}$ by $\frac{1}{4}$ in.

2. **L. Pinceana,** *Hook. Bot. Mag.* t. 4132; leaves elliptic-lanceolate acuminate, nerves suberect, inflorescence glabrous, corolla-lobes with interposed pairs of tubercles at their bases. L. gratissima, *Wall. Cat.* 6117 B.

KHASIA MTS., *Mrs. Mack*, &c., alt. 3–5000 ft. MISHMI HILLS, *Griffith.*
A bush 4–5 ft., very similar to *L. gratissima*, but with leaves smaller, narrower, more coriaceous with more numerous (12–14 pair of) nerves which are more straight and ascending. The inflorescence is quite glabrous, calyx-lobes larger, corolla-tube $1\frac{1}{2}$–2 in., and lobes nearly 2 in. across, with a pair of raised tubercles one on each side of the sinus. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. and broadly obovoid in Khasian specimens, very much larger, nearly 1 in. long with strongly ribbed valves in Mishmi ones.

TRIBE III. RONDELETIEÆ.

12. WENDLANDIA, *Bartl.*

Shrubs or small trees. *Leaves* opposite or ternately whorled; stipules entire or 2-fid. *Flowers* small, rosy or white, in terminal dense thyrsoid or panicled cymes, 2–3-bracteolate. *Calyx-lobes* 4–5, subequal, small, persistent. *Corolla* tubular- salver- or funnel-shaped, throat glabrous or hairy; lobes 4–5, imbricate in bud. *Stamens* 4–5, between the corolla-lobes, filaments 0 or elongate; anthers versatile, exserted. *Ovary* 2- (rarely 3-) celled; style filiform, stigma entire 2-fid or 2-partite; ovules numerous, on small globose placentas adnate to the septum. *Capsule* small, globose, loculicidally, rarely septicidally 2-valved, many-seeded. *Seeds* very minute, horizontal, compressed, testa membranous obscurely winged; embryo short, cylindric, in fleshy albumen.—DISTRIB. Species about 16, tropical Asiatic.

A. Leaves opposite.

* *Corolla-tube short, not twice the length of the oblong lobes: anthers large, much exserted. Stipules persistent or caducous.*

1. **W. exserta,** *DC. Prodr.* iv. 411; softly tomentose or pubescent all over, leaves opposite ovate-lanceolate glabrate above finely acuminate, stipules persistent recurved, calyx hairy lobes ovate or subulate, corolla-tube shorter than the lobes, stigma 2-partite. *W. & A. Prodr.* 402; *Wall. Cat.* 6267 A. C. D. E. F. *in part*; *Bedd. Fl. Sylv.* 130; *Brand. For. Fl.* 268. W. cinerea, *Wall. Cat.* 6268; *DC. Prodr.* iv. 412. Rondeletia exserta, *Roxb. Hort. Beng.* 14; *Fl. Ind.* i. 523. R. cinerea, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 141. R. thyrsiflora and orissensis, *Roth Nov. Gen. & Sp.* 142. R. Heynei, *Roem. & Sch. Syst.* v. 234.

Dry forests of the TROPICAL HIMALAYA, from the Chenab eastward to Nipal and Sikkim, ascending to 4000 ft. ORISSA, CENTRAL INDIA, N. DECCAN, and CONCAN.
A small crooked tree; branches terete. *Leaves* coriaceous, 4–9 by 1–$3\frac{1}{2}$ in.; nerves 10–18 pair, arched; stipules ovate, acute, recurved. *Panicles* sessile, pyramidal, 6–10 in. broad and long. *Flowers* $\frac{1}{6}$ in. diam., white, fragrant, sessile. *Stamens* nearly as large as the corolla-lobes. *Capsule* $\frac{1}{10}$ in. diam., white, tomentose.

2. **W. puberula,** *DC. Prodr.* iv. 412; leaves opposite elliptic-lanceolate acuminate glabrous except the nerves above slightly hairy chiefly on the nerves beneath, stipules persistent erect, panicle pubescent, calyx hairy, lobes triangular

or subulate, corolla-lobes shorter than the tube. *Wall. Cat.* 6270. W. scabra, *Kurz in Journ. As. Soc. Beng.* 1877, ii. 310. W. appendiculata, *Wall. mss.*

Dry forests of the TROPICAL HIMALAYA from Gurwhal to Nipal, alt. 0–4000 ft., *Wallich*, &c. AVA, *Kurz.*

Habit of *W. exserta*, but with smaller (4–6 by 2–3 in.) nearly glabrous elliptic leaves, which are more membranous, with fewer (10–12 pair) of nerves, and longer calyx-tubes often smaller panicles and nearly glabrous capsules; stipules very variable.

3. **W. Wallichii,** *W. & A. Prodr.* 402, *in note*; branches glabrous or puberulous, leaves opposite elliptic or elliptic-lanceolate acuminate at both ends glabrous or puberulous on the nerves beneath, stipules very caducous broad rounded, panicle pubescent, calyx glabrous teeth short triangular, corolla-tube a little longer than the lobes. *Wall. Cat.* 6269 B., *in part* (*tinctoria*).

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.* KHASIA MTS., alt. 4000 ft.; *De Silva.* &c., *Griffith* (Kew Distrib. 2834).

An erect nearly glabrous shrub; branches swollen at the nodes when dry. *Leaves* 5–7 by 1½–2½ in., rather coriaceous; nerves 10–12 pair, prominent beneath; petiole ⅓–⅔ in.; stipules so deciduous that I found only one in ten specimens, it is imperfect, broad, and apparently acute. *Panicle* moderate. *Flowers* like those of *W. puberula.*

** *Corolla-lobes rounded or shortly oblong, much shorter than the usually slender tube; anthers included or exserted. Stipules more or less persistent*

† *Calyx-teeth shorter than the tube.*

4. **W. tinctoria,** *DC. Prodr.* iv. 411; leaves opposite elliptic ovate or obovate acuminate glabrous or pubescent beneath, stipules erect large with a subulate point or a laterally flattened rigid appendage, calyx-teeth ovate. *Brand. For. Fl.* 269; *Kurz For. Fl.* ii. 74; *Bedd. Fl. Sylv.* t. 130. Rondeletia tinctoria, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 522.

TROPICAL HIMALAYA, from Garwhal and from BENGAL and OUDH, to the KHASIA MTS., ASSAM, CHITTAGONG, PEGU, and TENASSERIM.—DISTRIB. Java? Ava.

A small tree. *Leaves* 4–8 by 2–4 in., always narrowed into the petiole, glabrous and often shining above, paler rarely glabrous beneath, oftener pubescent on the nerves, sometimes tomentose all over; nerves 10–12 pair; petiole ½–¾ in. *Stipules* variable in length, always with erect points. *Panicles* large, spreading, pubescent pilose or tomentose; flowers sessile, fascicled, white, ¼ in. long; corolla-tube usually slender, the lobes forming a capitate not ovoid head; anthers shortly exserted. *Stigmas* oblong.—There are two principal forms.

VAR. 1. *normalis*; leaves 3–5 by 2–2½ in. elliptic more or less pubescent beneath, petiole ¼ in., panicle tomentose. *Wall. Cat.* 6267; (*exserta*) F. in part, 6269 D., 6269 D. 3. W. proxima, *DC. Prodr.* iv. 411. Rondeletia proxima, *Don Prodr.* 139.

VAR. 2. *grandis*; leaves 5–7 by 2–3½ in. elliptic perfectly glabrous, petiole ½–¾ in., panicle tomentose. *Wall. Cat.* 6266 B. A. (*paniculata*), *the lower specimen only*, 6269 A. W. budleoides, *Wall. mss. in W. & A. Prodr.* i. 402.—Khasia and Jyntea hills, *Wallich*, &c.; Naga hills, *Griffith*; Sikkim, *Herb. Griff.*; Assam, *Jenkins.*

5. **W. nitens,** *Wall. Cat.* 6271; robust, leaves opposite elliptic-oblong obtuse coriaceous shining above glabrous or puberulous on the nerves beneath, stipules erect very short triangular or broadly reniform apiculate, panicle pubescent, flowers in glomerules, calyx hairy, teeth short triangular.

TENASSERIM, Attran river, *Wallich*, *Helfer* (Kew Distrib. 2380).

Branches robust, glabrous. *Leaves* 4–5 by 1½–2 in., rarely obovate or subacute, nerves 6–8 in Helfer's specimen, 8–12 in Wallich's. *Panicle* robust. *Corolla* slender, lobes very small.—This may be a form of *W. tinctoria*, with which it is perhaps

united by a plant of Griffith's (Kew Distrib. 2835) from Menkroom, in Birma, with elliptic-lanceolate acuminate leaves, and much more pubescent panicles.

6. **W. glabrata,** *DC. Prodr.* iv. 411; glabrous or with the branches, leaves beneath and panicle minutely pubescent, leaves opposite petioled elliptic-lanceolate subacute obtuse or obtusely acuminate shining above, stipules erect small triangular cuspidate or acuminate, calyx glabrous, teeth minute triangular. *Kurz For. Fl.* ii. 74. W. Heyneana, *Wall. in W. & A. Prodr.* 403; *Cat.* 6274. W. sumatrana *and* W. lævigata, *Miq. Fl. Ind. Bat.* ii. 159, 346. Rondeletia tinctoria, *Blume Bijd.* 974.

MAISOR, *Heyne*; TENASSERIM, *Griffith* (Kew Distrib. 2836), *Helfer* (Kew Distrib. 2831 and 2832).—DISTRIB. Yunan, Malay Islands, Formosa.

A shrub or small tree. *Leaves* of the form, &c., of *W. tinctoria*, always glabrous except sometimes the midrib beneath, panicle glabrous or minutely puberulous (more so in *W. lævigata*, Miq.), flowers as in *W. tinctoria*, but calyx always glabrous with very short teeth. No one has sent this plant from Western India but Rottler, whose specimens (in Herb. Kew) are marked "Nundry dr, Mars 17, 1806." A single specimen from Parish has 3-nately whorled leaves.

W. tenuiflora, Miquel mss., appears a form with the slender branches of the panicle covered with empty bracteoles.

7. **W. coriacea,** *DC. Prodr.* iv. 412; everywhere quite glabrous, leaves opposite coriaceous petioled narrowly lanceolate finely acuminate shining above, stipules erect very short and broad with an erect laterally compressed appendage, panicles very many and dense-fld., calyx glabrous, teeth short. *Wall. Cat.* 6279. Rondeletia coriacea, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 142.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 2–4000 ft., *J. D. H.*

A small tree or large shrub. *Leaves* 5–6 by $1\frac{1}{2}$–2 in., coriaceous, pale when dry, narrowed into a petiole $\frac{1}{2}$ in.; nerves about 10 pair, very delicate. *Panicles* 4–5 in. high and broad, branches flowering all over. *Flowers* sessile, $\frac{1}{3}$ in. long. *Calyx-teeth* triangular or ovate-lanceolate. *Corolla-tube* slender, lobes broadly oblong. *Anthers* shortly exserted, stigmas short.—This differs from *glabrata* in the longer narrower coriaceous leaves with faint nerves and finely acuminate points and the larger flowers.

8. **W. paniculata,** *DC. Prodr.* iv. 411; leaves opposite elliptic or elliptic-lanceolate acuminate more or less pubescent beneath, stipules recurved broad orbicular or oblong with tips rounded, panicle spreading villous, calyx-teeth rounded. *Wall. Cat.* 6266 A. (*upper specimen only*); 6269 (*tinctoria*), B. *in part*; 6267 (*exserta*), B. *in part.* W. luzoniensis, *DC. l. c.*, 412. Rondeletia paniculata, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 521. Gardenia Burha, *Ham. in Wall. Cat.* 8298.

ASSAM, SILHET, and KHASIA Mts., alt. 0–4000 ft. BIRMA, *Griffith* (Kew Distrib. 2837).—DISTRIB. Java, Moluccas.

A tree. *Leaves* usually large, 5–8 by 2–4 in., membranous, usually tapering to both ends, rarely narrowly obovate, nerves 8–10 pair, petiole usually $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules coriaceous, pubescent. *Panicle* ample. *Flowers* as in *W. tinctoria*.

†† *Calyx-teeth longer than the tube.*

9. **W. ligustrina,** *Wall. Cat.* 6272; branches slender glabrous, leaves opposite elliptic or elliptic-ovate acute glabrous or puberulous on the nerves beneath, petiole rather long, stipules broadly triangular cuspidate, panicle lax pubescent, calyx glabrous, teeth filiform longer than the tube.

AVA; Taong-dong Mts., *Wallich.*

Much branched, leafy. *Leaves* 4–5 by 1–2 in., acute not acuminate, rather coriaceous, nerves 6–8 pair, petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules appressed. *Panicle-branches* slender. *Corolla-lobes* oblong, half as long as the tube; stamens and styles much exserted.—

Wallich's specimen alone seen; well distinguished by the simply acute leaves and glabrous calyx with long teeth.

10. **W. glomerulata,** *Kurz in Journ. As. Soc.* 1872, ii. 310; 1877, ii. 129; *For. Fl.* ii. 77; branches slender glabrous, leaves opposite narrow-lanceolate long-acuminate glabrous membranous, stipules large orbicular recurved, panicle small pubescent, calyx hirsute, teeth much longer than the tube.

TENASSERIM; at Mergui, *Griffith, Helfer* (Kew Distrib. 2838), *Kurz.*

An evergreen small tree or shrub. *Leaves* 6–7 by $\frac{3}{4}$–$1\frac{1}{4}$ in., much attenuate at both ends; nerves 12–15 pair; petiole $\frac{1}{4}$–1 in.; stipules leafy, sometimes 2-fid, very persistent. *Panicle* with slender branches. *Corolla-tube* funnel-shaped, twice as long as the calyx-teeth. *Stamens* much exserted. *Capsule* hispid.—The narrow leaves, stipules, and hispid calyx with long teeth, well distinguish this species.

B. Leaves usually 3-nately whorled (see also 6. *W. glabrata*).

11. **W. Notoniana,** *Wall. in W. & A. Prodr.* 403; *Cat.* 6273, 6267 G. (*W. exserta*); robust tomentose except the leaves above, leaves usually 3-nately whorled rarely opposite short petioled elliptic or elliptic-lanceolate acuminate, stipules recurved with rounded or 2-fid. tips rarely straight and acute, panicle pyramidal hirsute dense-fld., calyx hirsute, teeth ovate-lanceolate. *Wt. Ic.* t. 1033; *Dalz. & Gibs. Bomb. Fl.* 117; *Bedd. Fl. Sylv.* t. 224. Webera thyrsoidea, *Roth Nov.* sp. 149. Canthium thyrsoideum, *Roem. Sch. Syst.* v. 207. Ixora montana, *Miq. in Herb. Hohen. n.* 336.

Hills of the DECCAN PENINSULA, alt. 2–6000 ft., common. CEYLON, hills of the central province, ascending to 7000 ft.

A shrub or small tree. *Leaves* 3–$5\frac{1}{2}$ by $2\frac{1}{2}$ in., coriaceous, rarely obovate, nerves 8–10 pair, strong beneath, not shining above, pale when dry, petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules variable, usually smaller than in *W. tinctoria. Flowers* reddish-white (Wight), odorous. *Calyx* hairy, teeth variable in length.—This is the southern representative of *W. tinctoria.*

VAR. 1. *bicuspidata*; leaves nearly glabrous longer petioled, stipules entire or 2-fid or divided into 2, calyx glabrous or hairy, teeth short obtuse. W. bicuspidata, *W. & A. Prodr.* 403.—Mts. of Travancore and Ceylon.

VAR. 2. *zeylanica*; leaves nearly glabrous lanceolate narrowed into a slender petiole, panicle pubescent very large and lax with long filiform spreading and drooping branches, flowers scattered sessile and on slender pedicels, calyx quite glabrous, teeth very minute.—Ceylon, *Thwaites.*

12. **W. Lawii,** *Hook. f.*; branches and inflorescence tomentose, leaves ternately whorled lanceolate obtuse pubescent on the nerves beneath, stipules broadly triangular acute, panicles very large, branches 3-nate very slender erect, flowers often long pedicelled, calyx hairy lobes filiform longer than the tube.

MAISOR; on the Bababoodan hills, *Law.*

Branches slender. *Leaves* (upper alone seen) 3–4 by 1 in., quite glabrous above, paler and almost shining beneath, nerves 8–9 pair, strong; petiole $\frac{1}{4}$ in.; stipules short, broad. *Panicle* a foot long, softly downy with white hairs. *Branches* very long and slender, forming a rather flat-topped corymb. *Flowers* laxly scattered, mixed with subulate or linear bracteoles, most of which are not floriferous. *Calyx-teeth* variable, sometimes short. *Corolla-tube* $\frac{1}{6}$ in., very slender.—Closely allied to *W. Notoniana*, differing in the form of the panicle and calyx-teeth.

13. **W. angustifolia,** *Wight mss.*; everywhere glabrous, leaves ternately whorled narrowly linear-lanceolate acute, stipules triangular-ovate acute, panicle slender pyramidal, calyx-teeth short subulate.

TINNEVELLI; at Courtallum, *Wight.*

Branches rather slender. *Leaves* 3–4 by $\frac{1}{3}$–$\frac{2}{3}$ in., narrowed into the short petiole, coriaceous, not shining, midrib strong, nerves about 8 pair very slender; stipules persistent. *Panicle* leafy below. *Flowers* rather crowded, often pedicelled. *Corolla-tube* slender, $\frac{1}{6}$ in.; lobes almost orbicular, small. *Anthers* shortly exserted. *Stigma* shortly clavate, entire or 2-fid.—A very distinct species.

14. **W. pendula,** *DC. Prodr.* iv. 412; branches and inflorescence pubescent, leaves 3-nately whorled sessile ovate or ovate-lanceolate obtusely acuminate puberulous on the nerves beneath, stipules small very shortly triangular, panicle small, calyx glabrous, teeth lanceolate about equalling the tube. *Wall. Cat.* 6275.

NIPAL, *Wallich*; Pemmi river, alt. 4000 ft., *J. D. H.*

A shrub, branches slender. *Leaves* 3–4 by $1\frac{1}{4}$–$1\frac{3}{4}$ in., thin, shining and reticulated above, base rounded or subacute, nerves 6–7 pair, petiole hardly any; stipules very inconspicuous. *Panicle* 4–6 in. long, branches stout. *Flowers* rathered clustered, often pedicelled. *Corolla-tube* $\frac{1}{6}$ in., slender, lobes oblong. *Stamens* shortly exserted; stigma clavate.—A most distinct species.

13. GREENEA, *W. & A.*

Shrubs. *Leaves* opposite or whorled in threes; stipules various. *Flowers* small, white, sessile in terminal panicled scorpioid cymes, bracteoles slender or 0. *Calyx-tube* globose; lobes 4–5, subulate or ovate, persistent, one longer than the others. *Corolla* funnel-shaped, tube long, glabrous within; lobes 4–5, twisted in bud. *Stamens* 4–5 in the corolla-throat, filaments short; anthers linear, 2-fid at both ends. *Ovary* 2- rarely 3-celled; style filiform, stigmas 2 linear revolute; ovules numerous on peltate placentas adnate to the septum. *Capsule* small, globose, 2-celled, septicidally 2-valved, valves with separable endocarp, placentas at length free many-seeded. *Seeds* falcate, or subcubical, or angled, testa narrowly winged; embryo club-shaped in fleshy albumen.—DISTRIB. Species 5 or 6, Burmese and Malayan.

1. **G. Jackii,** *W. & A. Prodr.* 404; inflorescence and leaves beneath softly tomentose or villous, leaves oblanceolate obtusely acuminate, stipules large, flowers close-set. Rondeletia corymbosa, *Jack in Mal. Misc.* i. 4. R. spicata, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 139. Wendlandia? corymbosa, *Wall. Cat.* 6276; *DC. Prodr.* iv. 413; *Kurz For. Fl.* ii. 75. W.? spicata, *DC. l. c.* 412.

MALAYAN PENINSULA, from Tenasserim to Singapore, *Jack*, &c.

An evergreen shrub. *Leaves* membranous, 8–20 by $1\frac{1}{2}$–6 in., puberulous or glabrate above, narrowed into the very short petiole; nerves 20–30 pair, slender; stipules very variable in length and breadth, $\frac{1}{2}$–1 in., acute. *Panicle* subsessile, primary branches 3-chotomous, ultimate 2-chotomous; bracteoles filiform. *Corolla-tube* [illegible] in., hairy, twice as long as the 4 ovate lobes. *Capsule* $\frac{1}{8}$ in. diam., pubescent.

2. **G. Wightiana,** *W. & A. Prodr.* 404; inflorescence puberulous, leaves elliptic-lanceolate or oblanceolate acuminate glabrous except sometimes the midrib beneath, stipules with long subulate points, flowers separate. *Wt. Ic.* t. 1151. Wendlandia? Wightiana, *Wall. Cat.* 6277; *G. Don Gen. Syst.* iii. 520. W.? secunda, *Griff. Notul.* 266; *Kurz For. Fl.* ii. 75. Guettarda, sp. *Wall. Cat.* 8400.

TENASSERIM, *Gomez*, &c. BIRMA, *Griffith*.

A shrub or small tree. *Leaves* much like those of *G. Jackii*, but glabrous with longer petioles and fewer nerves; stipules usually suddenly contracted to a long point. *Panicles* sessile or long- or short-peduncled, branches very slender. *Corolla-tube* $\frac{1}{2}$ in., puberulous, thrice as long as the 4–5 ovate lobes. *Capsules* puberulous.

TRIBE IV. **HEDYOTIDEÆ.**

14. **DENTELLA,** *Forst.*

A small weak prostrate annual or perennial-rooted herb. *Leaves* small; stipules connate, scarious. *Flowers* minute, solitary, axillary and in the forks, sessile or pedicelled, white. *Calyx-tube* globose; limb tubular, persistent. *Corolla* funnel-shaped, hairy within; lobes 5, 2–3-toothed, induplicate-valvate. *Stamens* 5, in the middle of the corolla-tube, filaments short; anthers linear. *Ovary* 2-celled; style short, stigmas filiform; ovules numerous on hemispheric placentas. *Fruit* small, dry, globose, 2-celled, indehiscent, many-seeded. *Seeds* minute, angled, testa dotted.

1. **D. repens,** *Forst. Char. Gen.* 26, t. 13; *Roxb. Fl. Ind.* i. 532; *Wall. Cat.* 6206; *W. & A. Prodr.* 405; *Dalz. & Gibs. Bomb. Fl.* 115. Oldenlandia repens, *Linn. Mant.* 40. Hedyotis repens, *Lam. Ill.* 1424, *not of Don.* Lippaya telephioides, *Endl. Atakt.* t. 13.

In moist places throughout Bengal and eastward to Birma, and in both Peninsulas to Ceylon and Singapore. —DISTRIB. Malayan Islands, N. Australia, Polynesia.

A straggling weed, stems rooting at the joints. *Leaves* ¼ in., obovate spathulate or elliptic, ciliate or glabrous. *Flowers* $\frac{1}{12}$ in. *Style* cleft nearly to the base. *Capsule* $\frac{1}{10}$ in. diam., hispid or glabrous.

15. **ARGOSTEMMA,** *Wall.*

Small delicate herbs. *Leaves* usually membranous, opposite, pairs very unequal, or falsely whorled; stipules entire, persistent or obsolete. *Flowers* white, in peduncled cymes or umbels. *Calyx-tube* short; lobes 5, rarely 3–7. *Corolla* rotate, 4–5-partite, valvate. *Stamens* 4–5, filaments short; anthers large, free, conniving or cohering, erect or declinate, dehiscing by 1–2 terminal pores, rarely longitudinally. *Ovary* 2-celled; style filiform, stigma capitellate; ovules very many on projecting placentas. *Capsule* coriaceous or membranous, 2-celled, dehiscing at the apex or by an operculum. *Seeds* minute, angled or compressed, testa granulate or reticulate; embryo most minute, in dense fleshy albumen.—DISTRIB. Species about 40, all from subtropical Asiatic and Malayan Mts., except one African (which is also Indian).

* Leaves opposite or whorled.

† *Flowers 4-merous.*

1. **A. sarmentosum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 324; *Cat.* 8396; leaves sessile or petioled opposite or in whorls of 4 orbicular elliptic or broadly obovate obtuse sparingly pubescent, umbels terminal, calyx pubescent, teeth ovate obtuse, anthers 4 free slender opening by pores. *Benn. Pl. Rar. Jav.* 95. Sonerila angustifolia, *Wall. Cat.* 4090.

SUBTROPICAL HIMALAYAS, from Garwhal to Bhotan, alt. 2–5000 ft. KHASIA MTS., alt. 2–4000 ft., *J. D. H. & T. T.*

Stems 2 in. to a span, often with filiform very long simple or branched runners from buds below the leaves. *Leaves* 1–4 in., 4 in a whorl, or in 2 rarely more pairs, equal or more or less unequal or dissimilar. *Umbels* simple, 1– many-fld.; bracts ovate; pedicels ¼–½ in., very stout. *Flowers* white, with a green eye, ¾ in. diam. *Calyx-lobes* ovate. *Corolla* segments acuminate.

2. **A. courtallense,** *Arn. in Ann. Nat. Hist.* iii. 22; sparsely pubescent, leaves subsessile in whorls of 4 ovate or orbicular-ovate subacute or obtuse base contracted rounded or cordate, umbel terminal simple, calyx-teeth

acute, anthers 4 free oblong-lanceolate curved opening by pores. *Wt. Ic.* t. 1160. A. connatum, *Dalz. in Hook. Kew Journ.* iii. 345; *Dalz. & Gibs. Bomb. Fl.* 118 (*by error* cuneatum).

Mountains of the WESTERN PENINSULA, from Canara to Travancore, *Rottler, Heyne*, &c.

Three inches to a span high. *Leaves* never more than 4, very variable in size and shape, rarely acute or shortly petioled. *Umbels* 3- many-fld. *Flowers* about $\frac{2}{3}$ in. diam., white. *Corolla-lobes* acute.

3. **A. tavoyanum,** *Wall. in Benn. Pl. Jav. Rar.* 95; *Cat.* 8393; leaves subsessile opposite or in whorls of 4 ovate acute base contracted or cordate, umbels terminal, calyx pubescent teeth ovate, anthers 4 free oblong-lanceolate with terminal pores.

TENASSERIM; Tavoy, *Wallich*. MARTABAN, at Moulmein, *Parish*.

Sparsely pilose; stem 2–4 in. *Leaves* sometimes only one pair, usually 4 in a whorl, rarely with a smaller pair added, equal or more or less unequal. *Umbels* simple, many-fld. *Flowers* $\frac{1}{4}$ in. diam. *Corolla* $\frac{1}{3}$ in. diam., and segments acute short.—This may prove to be a variety of *A. courtallense*, but the leaves are more acute and the calyx-lobes more obtuse, and the corolla smaller with shorter lobes, as far as I can make out by moistening the dried specimens.

4. **A. khasianum,** *C. B. Clarke*; leaves sessile or petioled opposite or in whorls of 4, elliptic ovate acute or subacute glabrous, umbels terminal and axillary and their peduncles pubescent, calyx-teeth broad acute, anthers 4 free linear-oblong straight opening by pores. A. verticillatum, *Wall. Cat.* 8394, *in part.*

KHASIA MTS., alt. 2–4000 ft., *De Silva*, &c.

Closely allied to *A. courtallense*, differing in the much narrower glabrous leaves, often 2–3 umbels, which are more closely pubescent; the anthers, too, are more strictly oblong. There are sometimes as many as 8 leaves of very various size in irregularly superposed pairs, and the midrib and nerves are sometimes white.

†† *Flowers 5-merous.*

5. **A. pictum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 327; *Cat.* 8392; leaves sessile or shortly petioled, usually in a whorl of 4 of which 2 are very small and 2 very large, broadly ovate or almost orbicular obtuse or subacute glabrous or with a few short scattered hairs, umbels 1–3 terminal simple glabrous, anthers 5 coherent linear-oblong straight opening by pores. *Benn. Pl. Jav. Rar.* 94.

PENANG; *Wallich*, &c.

1–4 in. high. *Leaves* usually large, sometimes 4 by 3 in., often variegated along the midrib and nerves. *Peduncle* slender. *Calyx-teeth* broad, acute.

6. **A. verticillatum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 325; *Pl. As. Rar.* ii. 80, t. 185; *Cat.* 8394, *in part*; leaves sessile 4 in a whorl lanceolate or ovate-lanceolate finely acuminate glabrous unequal, umbels 1 or more terminal sometimes branched, anthers 5 free linear-oblong straight apiculate opening by pores. *Benn. Pl. Jav. Rar.* 94. A. glaberrimum, *Dalz. in Hook. Kew Journ.* iii. 345; *Dalz. & Gibs. Bomb. Fl.* 118. A. acutum, *Wall. mss.*

TEMPERATE HIMALAYA, from Kumaon to Sikkim, alt. 2–6000 ft. KHASIA MTS., alt. 4000 ft. CANARA; in the Warree country, on trees, *Dalzell*. MARTABAN, at Moulmein, *Parish*. PENANG, *Wallich*.

Leaves 1–5 in., broader more ovate and distinctly petioled only in Moulmein specimens, very rarely with an additional pair of leaves below the whorl. *Umbels* 1–3, sometimes compound, all terminal. *Flowers* about $\frac{1}{2}$ in. diam. *Calyx-teeth* acute.

7. **A. Parishii**, *Hook. f.*; quite glabrous, leaves sessile in whorls of 5 or 6 or oftener in several superimposed pairs elliptic-lanceolate acuminate, umbels branched terminal, calyx-teeth very short, anthers 5 free linear-lanceolate straight obtuse opening by pores.

MARTABAN; hills behind Moulmein, *Parish.*

Similar in many respects to *A. verticillatum*, and, like it, quite glabrous; but the leaves are far more numerous, usually in approximate pairs, the corolla lobes longer and very acute, the anthers much longer and obtuse.

8. **A. pumilum**, *Benn. Pl. Jav. Rar.* 95; glabrous, leaves sessile about 10 almost whorled lanceolate tip rounded lowest obovate, umbels very shortly peduncled irregularly few-flowered, calyx-teeth broad obtuse, corolla-lobes long subacute, anthers 5 free oblong opening by slits throughout their length. A. verticillatum, *Wall. Cat.* 8394 B., *chiefly; Hiern in Fl. Trop. Africa*, iii. 44.

KHASIA MTS., alt. 0–2000 ft., *De Silva*, &c.—DISTRIB. W. trop. Africa.

A very small rather rigid species, 1–1½ in. high; stem stiff. *Leaves* 1–1½ in., more coriaceous than usual in the genus. *Umbels* smaller than the leaves, few-fld. *Flowers* ¼ in. diam.—The West African specimen from Mt. Sierra del Crystal (on the upper Gaboon river) differs only in the anthers opening towards the summit.

9. **A. Lobbii**, *Hook. f.*; very slender, quite glabrous, leaves in numerous superposed whorls of 4–6, of which 1 is much the longest linear-lanceolate subacute, umbels axillary and terminal, pedicels slender divaricate, calyx-teeth short, corolla-lobes long, anthers 5 free linear-lanceolate curved with minute pores.

MARTABAN; at Moulmein on limestone rocks, *Lobb*, *Parish.*

Stem succulent, 4–6 in. *Leaves* in about 5–8 equidistant whorls, the long ones 1–1½ in., curved upwards, the short ones ¼–½ in. *Umbels* branched from the base or peduncles forked. *Flowers* ⅓ in. diam. *Calyx* very small. *Anthers* not conniving. *Stigma* minute.

10. **A. rostratum**, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 326; *Cat.* 8395; quite glabrous, leaves whorled or in superimposed pairs linear or elliptic-lanceolate acuminate with often bulbiferous axils, umbels small solitary simple or compound, corolla-lobes caudate-acuminate, anthers 5 coherent oblong with long slender beaks opening by pores. *Benn. Pl. Jav. Rar.* 95.

KHASIA MTS., alt. 3–5000 ft., *De Silva*, &c.

Very variable indeed in stature and foliage. *Stem* 3–10 in., slender or robust. *Leaves*, the larger on each plant 1½–8 in., membranous, sessile or shortly petioled. *Umbels* very various, few-fld. *Peduncles* 1–3 in. *Flowers* ½ in. diam. *Calyx* small, lobes short broad. *Anthers* very large for the size of the flowers, erect; straight beaks as long as the cells.—The beaked anthers distinguish this from all allied species. The bulbiferous specimens have smaller leaves and long capillary runners; they often somewhat resemble *A. Lobbii.*

** Stem with a terminal pair of leaves, one very large, the other very small, and sometimes one or more pairs of very small leaves lower down.

11. **A. humile**, *Wall. in Benn. Pl. Jav. Rar.* 94; *Cat.* 8391; leaves glabrous, uppermost pair of a very large ovate-lanceolate acuminate and a very small ovate one, lower pairs few or solitary very small ovate subequal, umbels solitary puberulous, bracts large, corolla-lobes lanceolate, anthers 4 linear-subulate straight free obtuse opening by pores.

KHASIA MTS.; Mahadeb, *Griffith*; Churra, *J. D. H. & T. T.* PENANG, *Jack.*

Very variable in size. *Stem* 1–2 in., very short in comparison with the large leaf, which is 2–5 in. long, sessile, membranous, the smaller leaf is ovate, ¼–½ in. long. *Umbels* 3–many-fld; bracts ovate or orbicular. *Anthers* more than half the length of the corolla-lobes. *Stigma* minutely capitate.

12. **A. unifolium,** *Benn. Pl. Jav. Rar.* 94; quite glabrous, leaves 2 only larger long-petioled ovate caudate-acuminate smaller (stipule?) sessile ovate-cordate, umbels compound, pedicels slender, anthers 5 coherent elongate-subulate opening by pores.

PENANG, *Porter.* MALACCA? *Maingay.*

Stem slender, a span high. Larger *leaf* membranous, 5–8 by 2–4½ in., base rounded or cordate, petiole 1–1½ in.; smaller, ¼–1 in., recurved. *Flowers* numerous, ½ in. diam. *Calyx-lobes* small, broad, obtuse. *Corolla-lobes* lanceolate, equalling the anthers. *Stigma* minute, capitate.—The largest-leaved species of the genus.

13. **A. Kurzii,** *C. B. Clarke*; quite glabrous, leaves 2 only, larger sessile broadly ovate obtuse or obtusely-acuminate, smaller (stipule?) ovate, umbels simple, bracts 4, anthers 5 free broadly oblong-obtuse dehiscing by their whole length. A. unifolium, *Kurz in Journ. As. Soc.* 1877, ii. 131, *not of Blume.*

MARTABAN; at Moulmein, *Parish*; Attran, *Scott.*

Stem simple, 3 in., forked, in one specimen stout, succulent. *Leaves* membranous, large, 3½–5 by 2½–3 in., base rounded, smaller, ½ in., obtuse. *Umbel* 4–8-fld; bracts almost orbicular, equal. *Flowers* ⅓ in. diam. *Calyx-teeth* very short, broad acute. *Corolla-lobes* lanceolate, much longer than the anthers.—Only three specimens seen.

*** Stem prostrate with many subequal pairs of thick distichous leaves, one of each pair very large, the other very small.—Habit of *Elatostemma*, anthers with long beaks.

14. **A. Elatostemma,** *Hook. f.*; stem umbel and leaves beneath furfuraceously tomentose, large leaf of each pair shortly petioled obovate-oblong obtuse base contracted cordate, smaller sessile ovate-cordate, umbels few-fld simple or compound, corolla-lobes lanceolate, anthers 5 coherent subulate produced into a long straight beak opening by pores.

PENANG, *Griffith.* SINGAPORE, *Lobb.*

Stem 6–8 in., prostrate, very robust, simple or branched, sometimes rooting at the nodes. *Leaves* 6–8 pairs, larger 2–2½ in., coriaceous; nerves about 10 pair, united by very stout reticulating nerves. *Peduncle* softly tomentose. *Flowers* ¾ in. diam. *Calyx* small, lobes triangular, acute. *Stamens* as long as the puberulous corolla-lobes.—This species singularly resembles an *Elatostemma* in habit.

15. **A. parvifolium,** *Benn. Pl. Jav. Rar.* 96; stem hispid, large leaf of each pair petioled elliptic-ovate acute with few scattered cellular hairs above, glabrous beneath except the midrib, smaller sessile ovate, umbels few-fld., simple pubescent, corolla-lobes lanceolate, anthers 5 coherent subulate produced into a long straight beak. *Miq. Fl. Ind. Bat.* ii. 165, t. 31 D.

SINGAPORE, *Lobb.*—DISTRIB. Java.

Stem 4–8 in. slender, prostrate, simple or branched, rooting at the nodes. *Leaves* thick and succulent, in 4–8 distant or approximate pairs; larger ½–1¼ in., base rounded or cordate and equally or unequally auricled; smaller ⅛ in.; nerves indistinct. *Flowers* similar to those of *A. Elatostemma*, but beak of anthers shorter.

16. **A. ophirense,** *Maingay mss.*; stem robust sparsely hairy, leaves coriaceous glabrous, larger of each pair subsessile oblanceolate or obovate obtuse or acuminate obliquely auricled at the base, smaller obliquely ovate-cordate sessile, umbels few-fld.

MALACCA; on Mt. Ophir, *Maingay.*

Stem 8–10 in., ascending, nodose, copiously rooting at the base, succulent. *Leaves* thick and succulent, in many pairs, larger 2–3½ by ⅔–1½ in., smaller ⅛–¼ in. *Calyx-lobes* very broad, acute. *Corolla* and *stamens* not seen.

17. **A. spinulosum,** *C. B. Clarke*; stem stout hispid with curled hairs, large leaf of each pair petioled oblanceolate acute, glabrous above with minute spinulose hairs on and near the margin, hairy on the nerves beneath, smaller ovate-lanceolate acuminate, umbels forked compound many-fld., anthers 5 coherent subulate produced into a short beak.

SINGAPORE, *Lobb.*

Only one specimen seen. *Stem* 4 in., very stout, flexuous and rooting below. *Leaves* rather thick and succulent in 4 pairs, the larger 4–5 by 1¼ in., base contracted obliquely, auricled, nerves spreading raised beneath, petiole ⅓ in.; smaller ½ in., more membranous. *Umbel* and *peduncle* quite glabrous. *Flowers* ½ in. diam. *Calyx-lobes* triangular-ovate, acuminate. *Corolla-lobes* lanceolate.

DOUBTFUL SPECIES.

A. INÆQUILATERUM, *Benn. Pl. Jav. Rar.* 95; "leaves usually 4 in a whorl more or less unequal, lanceolate or ovate-lanceolate unequal-sided acuminate glabrous; umbel subsimple few-fid; flowers 5-merous."—Perhaps *A. verticillatum.*

A. SONERILOIDES, *Kurz in Journ. As. Soc.* 1872, ii. 310; calyx-lobes 3–4; corolla subcampanulate, 3–4-lobed; leaves whorled; anthers oblong obtuse.—Andaman Islands, *Kurz.*—Very imperfect specimens from Dr. King do not enable me to refer this satisfactorily to any described species: it resembles *tavoyanum.*

A. OLIGANTHA, *Kurz in Journ. As. Soc.* 1877, ii. 131.—An Andaman species and another of Kurz, from Boronga Island, on the Arracan coast, are not recognisable

16. CLARKELLA, *Hook. f.*

A very small erect glabrous puberulous herb. *Leaves* opposite, petioled, ovate, one of the lower pair usually suppressed, the other very large; stipules minute, broadly ovate, or obsolete. *Flowers* 1–6 in., in peduncled terminal bracteate cymes, white. *Calyx-tube* obconic, produced above the ovary; limb dilated, 5–7-toothed. *Corolla-tube* long, slender, funnel-shaped above, throat glabrous; lobes 5, lanceolate, valvate. *Stamens* 5, near the bottom of the tube, filaments short slender; anthers linear-oblong. *Ovary* 2-celled; style short, arms 2 slender hairy; ovules many, on ascending placentas attached to the septum below its middle. *Capsule* obconic, 5–7-ribbed, crowned with the dilated calyx-limb, membranous, indehiscent, many-seeded. *Seeds* very minute, irregularly ellipsoid, testa black papillose.

1. **C. nana,** *Hook. f.* Ophiorhiza nana, *Edgw. in Trans. Linn. Soc.* xx. 60.

TEMPERATE HIMALAYA, alt. 4–8000 ft. Kumaon, *Edgworth*, &c.; Garwhal, *Falconer.*

A very singular little plant, requiring examination in a living state as to its mode of growth. *Stem* 1–3 in., slender, simple, curved upwards, terminating below in a small fleshy tuber enclosed in a rather thick sheathing coat, the outer surface of which coat is clothed with short rigid rootlets that adhere to surrounding particles of sand and ground by suckers. *Radicle-leaf* ¾–1¼ in. diam., solitary, orbicular or broadly ovate, obtuse, membranous; nerves 4–5 pair, spreading and arching; petiole slender; besides this leaf there is a single pair of small leaves close to the cyme. *Cyme* on a stout peduncle ⅙–¼ in. long; bracts small, oblong. *Flowers* shortly pedicelled, erect, ½ in. long. *Calyx-lobes* triangular with acuminate tips. *Corolla* pubescent. *Stamens* and *style* near the very base of the corolla-tube. *Fruit* ⅓ in. long.—Named after my coadjutor in this work, C. B. Clarke, F.L.S.

17. NEUROCALYX, *Hook.*

Low herbs. *Leaves* opposite, crowded, membranous, entire or toothed, reticulate; stipules large, 2-fid, or multifid. *Flowers* rather large, pale purple,

in short axillary nodding racemes or heads; bracts simple or 3-toothed or -partite. *Calyx-lobes* 5, broad, membranous, reticulate. *Corolla* rotate; lobes shorter and narrower than the calyx-lobes, valvate. *Stamens* 5, filaments very short; anthers connate in a conical tube, bursting inwards. *Ovary* 2-celled; style filiform, stigma capitellate; ovules numerous on swollen peltate placentas. *Fruit* coriaceous or fleshy, usually irregularly bursting, many-seeded. *Seeds* minute, globose, testa crustaceous pitted; embryo obovoid in fleshy albumen.—DISTRIB. Species 6–8, on the Dekkan Mts., Ceylon, and Borneo.

1. **N. zeylanicus,** *Hook. Ic. Pl.* t. 174; glabrous, leaves oblanceolate acuminate narrowed into slender petioles, nerves beneath and inflorescence puberulous, flowers racemose, calyx-lobes lanceolate.

CEYLON; Suffragam district, ascending to 4000 ft., *Walker*, &c.

Stem woody, 2–8 in., clothed with spreading subspinescent stipular segments. *Leaves* 4–8 by 1–2 in.; nerves about 20 pair. *Peduncles* numerous, half as long as the leaves. *Flowers* ⅔ in. diam. *Corolla* not half as long as the calyx, lobes lanceolate.

2. **N. Wightii,** *Arn. in Ann. Nat. Hist.* ii. 22; leaves sessile oblanceolate acuminate glabrous above, nerves beneath and inflorescence furfuraceous, flowers racemose, calyx-lobes ovate acute. N. Hookeriana, *Wt. Ic.* t. 52. Argostemma calycinum, *Br. in Benn. Pl. Jav. Rar.* 97; *Wall. Cat.* 8397.

Southern Mountains of the WESTERN PENINSULA; Wynaad, *Hamilton*, &c.; Nilgherris, *Munro*. CEYLON, ascending to 2000 ft., *Walker*, &c.

Stem 2–4 in., woody, tortuous. *Leaves* 6–9 by 1½–3 in.; nerves 12–15 pair; stipules lanceolate, membranous. *Peduncles* not half so long as the leaves. *Flowers* ⅔ in. diam. *Corolla* nearly as long as the calyx, lobes ovate.

3. **N. capitata,** *Benth. mss.*; leaves oblanceolate narrowed into long stout petioles, nerves beneath and inflorescence pubescent, flowers capitate, calyx-lobes ovate acute.

CEYLON, *Walker*, *Champion*.

Stem erect, stout, a foot or more high, with distant pairs of large leaves, glabrous. *Leaves* 10–12 by 2½–4 in.; nerves 15–20 pair; stipules membranous, 2-partite, segments ovate caudate-acuminate, *Peduncles* axillary, shorter than the petioles; heads of flowers globose or oblong. *Flowers* ¾ in. diam. *Corolla-lobes* broadly ovate, obtuse, half as long as the calyx.—Very different from *N. Wightii* in the long stout stem, much larger petioled leaves with more numerous nerves, and larger flowers.

4. **N. Championii,** *Benth. in Thw. Enum.* 139; leaves sessile or petioled obovate-lanceolate obtuse bullate above, nerves beneath and inflorescence villous, flowers racemed, calyx-lobes ovate acute.

CEYLON; Kokool Corle, *Thwaites*.

Stem very short, woody. *Leaves* 3–6 by 1–2 in., midrib hairy above, base obtuse or narrowed into the petiole; nerves about 10 pair; stipules membranous, 2-partite. *Racemes* half as long as the leaves. *Flowers* ½ in. diam. *Corolla-lobes* narrow, oblong, equalling the broadly ovate acute calyx-lobes.

5. **N. Gardneri,** *Thw. Enum.* 139; leaves obovate-lanceolate with rounded apiculate tips narrowed into a very short petiole hairy above and beneath, inflorescence racemose villous, calyx-lobes ovate- or orbicular-cordate.

CEYLON; Pasdoon Corle and Hewetsea, *Gardner*, *Thwaites*.

Stem short, stout, woody, villous. *Leaves* 4–10 by 1½–3½ in., very membranous, ciliate, obscurely crenulate; nerves 15–18 pair; stipules 2-partite, segments caudate-acuminate. *Corolla* not seen.

18. **ALLÆOPHANIA,** *Thwaites.*

Undershrubs; branches 4-angled. *Leaves* sessile or shortly petioled, ovate or lanceolate; nerves close; stipules connate into a scarious bristly tube. *Flowers* minute, polygamo-diœcious, in axillary dense cymes, pale purple. *Calyx-tube* obconic; limb bell-shaped, 4-ribbed and with 4 bristle-like teeth, persistent. *Corolla* funnel-shaped; tube and throat hairy; lobes 4, valvate in bud. *Stamens* 4, inserted between the corolla-lobes, filaments of ♂ long exserted; anthers linear-oblong, obtuse. *Ovary* 4-celled; style filiform, ♀ exserted, arms 4 linear; ovules 1 basilar erect in each cell. *Fruit* small, turbinate, with 4 bony indehiscent pyrenes. *Seeds* erect, minute, broadly oblong or subglobose, compressed, narrowed at the base, testa membranous; embryo short, cylindric.—DISTRIB. Species 3, one Malayan, the others as below.

1. **A. decipiens,** *Thw. Enum.* 147; more or less hirsute or glabrate, leaves sessile or petioled ovate or lanceolate acute or acuminate, nerves strong beneath, stipules broad, calyx-teeth equalling the hairy fruit. Hedyotis nodulosa, *var. a. Thw. Enum.* 143, *as to C. P.* 105, *not of Arnott.*

CEYLON; Central Province, alt. 3–7000 ft.

An erect 3-chotomously branched shrub. *Leaves* 1–2½ by ⅓–1½ in., usually coriaceous and hairy or scabrid above, very variable in shape from broad ovate to narrow-lanceolate, base acuminate rounded or cordate, upper surface flat or bullate; petiole 0 or ¼–⅓ in.; stipular bristles hairy. *Calyx-limb* membranous. *Corolla-tube* hairy, lobes narrow, villous within. *Style* slender, hairy, arms spreading.—There are three varieties: one with broad sessile or petioled coriaceous leaves, scabrid above, with very strong nerves beneath; the second (var. *flavescens*, Thw. l. c.) with ovate-cordate petioled membranous very hairy leaves; the third with narrow-lanceolate coriaceous leaves glabrous and wrinkled above and strong hairy nerves beneath.—Closely allied to *Hedyotis rugulosa*, Korth., of the Malayan Islands, which has much longer calyx-teeth, on which Miquel founded the section *Tetragyneia* of *Hedyotis.*

2. **A. Arnottii,** *Hook. f.*; glabrous or nearly so, leaves petioled ovate-lanceolate acuminate nerves distinct, stipules caducous ovate with few subterminal bristles, calyx-teeth shorter than the glabrous fruit. Hedyotis nodulosa, *var. a. Thwaites Enum.* 143, *as to C. P.* 87, *not of Arnott.*

CEYLON; Newera Ellia, *Gardner*; Adam's Peak, *Thwaites.*

Closely allied to *A. decipiens*, but almost glabrous, with longer differently shaped stipules, smaller glabrous fruit and shorter calyx-teeth; the style, too, is quite glabrous.

19. **FERGUSONIA,** *Hook. f.*

A slender procumbent herb, branching from the base; branches very long, rooting below, acutely 4-angled; nodes ciliate. *Leaves* opposite, subsessile, lanceolate, scaberulous, 1-nerved, margin recurved; stipules connate with the petioles, erect, herbaceous, lanceolate, ciliate, persistent. *Flowers* small, axillary, shortly pedicelled, 2-bracteolate. *Calyx-tube* subpyriform; lobes 4, erect, lanceolate, ciliate, persistent. *Corolla* funnel-shaped, throat glabrous or hairy; lobes 4, short, valvate in bud, tips ciliate. *Stamens* 4, inserted between the corolla-lobes, filaments short; anthers linear-oblong. *Disk* epigynous, 4-lobed. *Ovary* 4-celled; style filiform, arms 2 linear hairy; ovules 1 basilar erect in each cell. *Fruit* of 4 pear-shaped coriaceous cocci crowned with the calyx-teeth. *Seeds* erect, pyriform; embryo compressed, subcylindric, radicle inferior.

1. **F. zeylanica,** *Hook. f. in Hook. Ic. Pl.* t. 1124. Borreria tetracocca, *Thw. Enum.* 442; *Bedd. Ic. Pl. Ind. Or.* t. 39.

COORG, *Beddome*; CEYLON, near Colombo, *W. Ferguson.*

Branches 1–2 ft. *Leaves* 1–1½ in., and whole plant pale green when dry. *Corolla* ⅙ in. long.—A very singular plant, which I was at first disposed to consider as belonging to *Psychotrieæ*, but which I think now to be closely allied to *Allæophania*, as I suspected when placing it in that tribe in the "Genera Plantarum." It differs remarkably from the other Hedyotidean genera in the form and insertion of the seed, and in the dimerous style with a 4-merous ovary, but is united with them through *Allæophania*.

20. HEDYOTIS, *L.*

Herbs, undershrubs or shrubs. *Leaves* very rarely ternately whorled; stipules free or combined in a bristly sheath. *Flowers* white or lilac, in terminal or axillary open close or capitate cymes. *Calyx-lobes* 4, acute, persistent, without interposed teeth. *Corolla* funnel- or bell-shaped; lobes 4, ovate, or linear, valvate in bud. *Stamens* 4, in the tube or throat of the corolla. *Ovary* 2-celled; style filiform, stigma 2-fid or 2-lobed; ovules numerous on sessile or pedicelled placentas, attached to the septum at or below the middle. *Fruit* small, membranous coriaceous or crustaceous, indehiscent or septi- or loculicidal or of 2 separable or connate cocci, 2–many-seeded. *Seeds* plano-convex or angled, testa very rarely winged; embryo clavate in horny albumen.—DISTRIB. Species about 80, chiefly tropical Asiatic.

A very difficult genus to define, a few species being intermediate between it, *Anotis* and *Oldenlandia*. Flowers rarely 5-merous. The solitary ovules on the face of the septum in each cell, and the seeds, distinguish *Spermacoce* from it; in habit they are often very similar.

SECT. I. **Diplophragma.** *Capsule* septicidally splitting into two 1–4-(rarely more-) seeded cocci, which dehisce ventrally, top not protruded between the calyx-teeth.—Erect or decumbent shrubs or herbs; stipules various.

* *Erect shrubs; cymes terminal or axillary, rarely corymbose or panicled, very rarely capitate; stipules not large and sheathing.*

† *Stipules entire or gland-serrate or -crenate, rarely pectinate.*

1. **H. fruticosa,** *Linn.*; glabrous, branches obtusely 4-angled, leaves petioled lanceolate acuminate, nerves distinct, stipules gland-crenate, cymes terminal panicled, calyx-teeth triangular recurved shorter than the ovoid smooth capsule. *W. & A. Prodr.* 408; *Burm. Fl. Zeyl.* t. 107. Spermacoce? hedyotidea, *DC. Prodr.* iv. 555.—*Rheede Hort. Mal.* iv. t. 57.

TRAVANCORE Mts., *Rottler, &c.* CEYLON, common up 3000 ft.

An erect shrub, green when dry. *Leaves* 2–4 in., coriaceous; nerves 6–12 pair. *Corolla-throat* woolly. *Seeds* 4 in each cell, plano-convex, or concavo-convex.—Wight and Arnott's var. β., with hispid cymes, appears to be *H. pruinosa*; Wallich's 837 *b*, the same authors refer to this species because it was gathered by Rottler, but Rottler's Herbarium contains Malayan plants, and that in question is *H. capitellata*. Wallich's 837 *a*, also from Rottler's Herbarium, is *H. pruinosa*.

2. **H. Maingayi,** *Hook. f.*; glabrous, leaves shortly petioled lanceolate or ovate-lanceolate acuminate nerveless, stipules entire eglandular, cymes terminal panicled, calyx-teeth lanceolate longer than the capsules.

MALACCA; on Mt. Ophir, *Griffith, Maingay* (Kew Distrib. 887).

A short much branched shrub, green when dry, 12–18 in. *Leaves* 1–2 in., acute or rounded at the base, petiole winged. *Flowers* more crowded than in *H. fruticosa*; flowers and fruit and seeds similar, except that the calyx-teeth are much longer and lanceolate.

Mo. Bot. Garden, 1896.

3. **H. evenia,** *Thwaites Enum.* 140, 419; shining, branches and inflorescence puberulous, leaves shortly petioled elliptic or ovate-lanceolate acute glabrous nerveless, margins recurved, stipules with sparingly glandular tips, cymes terminal panicled, calyx-lobes triangular obtuse shorter than the capsule.

CEYLON; Adam's Peak, *Gardner*.

A small shrub, yellow when dry; branches acutely 4-angled. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., coriaceous above, varnished and with a few scattered raised points. *Cymes* few-fld.—Fruit unknown, and hence the position of the species in the genus.

4. **H. cymosa,** *Thwaites Enum.* 142; glabrous, leaves sessile lanceolate obtuse or acute, nerves very faint, stipules ovate-lanceolate long-acuminate gland-serrate, cymes terminal panicled, calyx-teeth in fruit lanceolate exceeding the capsule. *Bedd. Ic. Pl. Ind. Or.* t. 35.

CEYLON; Hinidoon Corle, alt. 1000 ft., *Thwaites*.

A shrub, black when dry; branches obtusely angled. *Leaves* 2–3 in., coriaceous, margins not recurved. *Cymes* flat-topped, very minutely puberulous. *Calyx-teeth* much enlarged in fruit. *Capsule* almost didymous. *Seeds* solitary in each cell, much compressed, plano-convex (winged when ripe ?).

5. **H. Macræi,** *Hook. f.*; softly pubescent, leaves petioled recurved lanceolate acuminate many-nerved, stipules broader than long abruptly cuspidate eglandular, cymes terminal panicled, calyx-teeth shorter than the capsule.

CEYLON, *Macræ*.

Grey-green when dry; branches obscurely 4-angled. *Leaves* 3–4 in., recurved and complicate, narrowed into a petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long, rather scabridly pubescent above, softly tomentose beneath; stipules tomentose. *Cymes* large, rounded, with whorled spreading branches. *Flowers* small, $\frac{1}{4}$ in. *Calyx* pubescent, as are the corolla-lobes within. *Capsule* small, ellipsoid, cells many-seeded.

6. **H. purpurascens,** *Bedd. Ic. Pl. Ind. Or.* t. 5 (*purpurea*); quite glabrous, leaves petioled ovate or ovate-lanceolate obtuse or obtusely-acuminate, nerves faint, stipules gland-serrate or pectinate, cymes terminal panicled, calyx-tube produced and teeth much longer than the capsule.

Mts. of TRAVANCORE and TINNEVELLI, *Wight* (Kew Distrib. 1357. *H. stylosa, var.*), *Beddome*.

A small woody shrub, yellow-green when dry; branches tortuous and nodose below. *Leaves* 1–3 in., coriaceous, margins flat, nerves variable in number; stipules pubescent. *Cymes* rounded in flower, flat-topped in fruit. *Calyx-lobes* oblong, obtuse. *Corolla* small, with small lobes. *Capsules* large, $\frac{1}{3}$ in., with the enlarged calyx narrowly ellipsoid, cells many-seeded.—There being an *H. purpurea* previously published (by A. Gray), but unknown to Col. Beddome, I have substituted that of *purpurascens* for his plant.

7. **H. scaberula,** *Hook. f.*; finely scaberulous throughout, branches slender elongate terete, leaves petioled ovate acute flat, nerves faint arched, stipules triangular obtuse appressed, margins glandular, cymes in a loose erect bracteate terminal leafy panicle, flowers pedicelled divaricate, calyx-teeth triangular much shorter than the subglobose capsule.

MARTABAN; at Moulmein, *Lobb*.

A very distinct species, rough to the touch all over, of which I have but one specimen, and that in fruit, pale green when dry; branches strict, slender, with long internodes. *Leaves* 2–3 in., base acute, equally scaberulous on both surfaces; petiole $\frac{1}{3}$ in. *Panicle* elongate, pyramidal in outline, with distant internodes; branches strict rather depressed, the lower with large leaves at the axils, uppermost naked, 3-chotomously branched at the ends. *Capsule* septicidal, the valves loculicidal. *Seeds* about 8 on each placenta.—This may be a climbing species, but there is no evidence of it.

†† *Stipules pectinate.*

8. **H. stylosa,** *Br. in Wall. Cat.* 853; glabrous, leaves petioled ovate or elliptic-ovate acute glabrous or hairy on the distinct nerves beneath, stipules connate pectinate with long subulate segments, cymes terminal, calyx-tube produced above the ovary, teeth short acute. *W. & A. Prodr.* 407; *Wt Ic.* t. 1027. H.? Leschenaultiana, *DC. Prodr.* iv. 422, *excl. var. β.* Knoxia Wightiana, *Schlecht. in Herb. Hohenack., not of Wallich.*

Mountains of MALABAR and TRAVANCORE, alt. 5–6000 ft., common, *Noton*, &c.

A much branched shrub, yellow-green when dry. *Leaves* 1–2 in., very variable in breadth and shape, coriaceous, margins flat or recurved, nerves few obscure above; stipules pubescent. *Cymes* short, flowers crowded. *Corolla-lobes* woolly within. *Capsules* globose, many-seeded.

9. **H. articularis,** *Br. in Wall. Cat.* 854; quite glabrous, leaves sessile small lanceolate or elliptic-lanceolate subacute, margins recurved, nerves below very broad, stipules connate pectinate with long subulate segments, calyx-tube produced above the ovary, lobes very short. *W. & A. Prodr.* 407; *Wt. Ic.* t. 1028.

NILGHERRY Mts., *Noton, Wight*, &c.

A small rigid stout leafy bush, yellowish when dry. *Leaves* $\frac{3}{4}$–1 in., very rigid, with 8–10 very broad and much raised longitudinal nerves beneath, marked by channels above. *Cymes* terminal, small, dense-flowered. *Calyx-limb* a 4-toothed cup, unaltered in fruit. *Corolla* puberulous, lobes glabrous, mouth woolly. *Capsule* very variable, from $\frac{1}{6}$ in. globose to $\frac{1}{3}$ in., obovoid; cells with 8–10 angular seeds.

10. **H. pruinosa,** *W. & A. Prodr.* 408; leaves petioled ovate-lanceolate or lanceolate acuminate glabrous, nerves distinct, stipules free pectinate, segments subulate, cymes pruinose, calyx-limb not produced, teeth subulate recurved shorter than the capsule. H. corymbosa, *Wall. Cat.* 6202, *chiefly*; 837 *a.* H. lentiginosa, *Bedd. Ic. Pl. Ind. Or.* t. 6.

TRAVANCORE and MALABAR; Quilon, *Wight*; in the backwaters, *Beddome.*

A shrub, yellowish when dry. *Leaves* 2–2$\frac{1}{2}$ in., margins flat; nerves few, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules not connate, short. *Cymes* spreading, many-flowered, hoary. *Corolla-mouth* woolly. *Capsules* small, obovoid, subclavate or globose, many-seeded.

11. **H. swertioides,** *Hook. f.*; leaves sessile glabrous elliptic acute margins undulate, stipules free very long slender pectinate with distant subulate segments, cymes very many in the upper axils and terminal densely pubescent, calyx-limb not produced, lobes lanceolate longer than the tube.

TINNEVELLI; in the Pulney Mts., *Wight* (Kew Distrib. 359).

A very fine and remarkable species, tall, erect, stout, with distant nodes, and a profuse oblong head of cymes, yellow when dry. *Leaves* 3 by 1$\frac{1}{2}$–1$\frac{3}{4}$ in., coriaceous, contracted at the base, but hardly petioled; nerves few, hardly raised; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., erect, stiff. *Cymes* very many-flowered. *Corolla* woolly at the mouth. *Fruit not seen.*—The stout strict branches and erect sessile broad coriaceous opposite leaves give the plant a gentianoid aspect.

12. **H. obscura,** *Thwaites Enum.* 14; glabrous except the youngest shoots and sometimes the nerves beneath, leaves sessile or petioled elliptic-lanceolate or ovate or suborbicular acute obtuse or acuminate, stipules connate pectinate, peduncles axillary filiform, cymes few-flowered, calyx-teeth subulate shorter than the capsule.

CEYLON; Central provinces, alt. 6–8000 ft., *Walker, Gardner*, &c.

A rigid woody shrub, black when dry, occurring under three very dissimilar forms, which Thwaites unites.—1. leaves petioled lanceolate 1–3 in., nerves very obscure,

peduncle with often 2 leafy bracts; 2. leaves sessile or subsessile ovate-lanceolate obtuse or subacute, nerves very obscure. H. ovata, *var.* minor. *Thwaites in Herb.*; 3. leaves petioled orbicular or broadly ovate acute or obtuse, nerves beneath very strong elevated, peduncles usually filiform very short and 3–8-fld. H. ovata, *var.* β. *Thwaites Enum. l. c.*—This last resembles a New Zealand *Coprosma* in habit; grows in shady places; its branches and peduncles are sometimes supra-axillary.

13. **H. Beddomei,** *Hook. f.*; stipules and inflorescence hairy, leaves small petioled elliptic-ovate subacute, nerves strong beneath, stipules broad ovate shortly united pectinate, cymes terminal subsessile capitate, calyx hispid tube shortly produced together with the ovate-lanceolate teeth about equalling the capsule. H. capitata, *Bedd. Ic. Pl. Ind. Or.* t. 191.

TRAVANCORE; on the Palghat hills, alt. 6500 ft., *Beddome.*

Stem woody with white bark. *Leaves* yellow when dry, 1–1½ in., contracted into a short flattened petiole, margin recurved when dry; stipules ⅙ in., acute. *Cymes* axillary and terminal, involucrate. *Corolla-tube* and lobes outside hispid, lobes inside glabrous except at the woolly mouth. *Capsules* sessile, cells about 4-seeded.

14. **H. buxifolia,** *Bedd. Ic. Pl. Ind. Or.* t. 1; glabrous, leaves small short-petioled ovate or ovate-cordate acute nerveless margins recurved, stipules connate at the base broad pectinate ciliate, cymes terminal and axillary 3-flowered, calyx-tube produced, teeth lanceolate.

TRAVANCORE; on the higher ranges of the Anamallay Mts., *Beddome.*

A large shrub, branches terete. *Leaves* ¼–½ by ¼ in., glabrous, shining, very coriaceous; stipules with a line of hairs down the centre. *Peduncles* ¼ in. *Flowers* subsessile; bracts filiform, ciliate. *Corolla-lobes* within and mouth villous. *Seeds* numerous.—Description from Beddome.

** *Erect shrubs; cymes terminal, capitate, or panicled. Stipules large, forming loose sheaths, which often become white with age.*

15. **H. quinquenervia,** *Thwaites Enum.* 141; nearly glabrous, leaves very coriaceous sessile orbicular very convex with margins and tips especially strongly recurved, very strongly 5-nerved from the base, stipular sheath cupular ciliate, cymes terminal sessile, calyx-tube produced and large ovate teeth together equalling the capsule. *Bedd. Ic. Pl. Ind. Or.* t. 8.

CEYLON; Central province, alt. 7–8000 ft., *Walker*, &c.

Stem woody, di-trichotomously branched; branches white below, above dark (when dry), with 2 lines of pubescence. *Leaves* dark or yellow-brown when dry, ½ in. diam., sometimes obovate-orbicular, abruptly contracted at the base; nerves deeply sunk above, beneath very thick; stipular sheath ⅛ in. long, loose. *Corolla-tube* glabrous, lobes hispid at the tip, glabrous within, except at the mouth. *Capsule* glabrous, cells 4-seeded.

16. **H. Lessertiana,** *Arn. Pugill. Pl. Ind. Or.* 21; glabrous or nearly so, leaves petioled ovate elliptic or lanceolate acuminate very coriaceous, nerves very strong, stipular sheath ciliate, cymes terminal capitate and subumbelled, calyx-tube more or less produced, teeth and limb together much shorter than the capsule. *Thwaites Enum.* 141; *Bedd. Ic. Pl. Ind. Or.* t. 31. C. flavescens, *Thwaites l. c.* 141 and 419.

CEYLON; Central province, alt. 3000 to 8000 ft., abundant.

A shrub with stout branches and leaves very variable in size, sometimes the largest of the genus, yellowish or brownish-green when dry; young shoots sometimes sparsely puberulous. *Leaves* 3–8 by 1–3 in., narrowed into a slender or stout petiole ¼–1½ in., almost plaited (rarely flat with slender nerves), the nerves being deeply sunk in the upper surface and highly raised on the under, where they are sometimes hairy, margins flat or recurved rarely ciliolate; stipular sheath ½–1½ in. long, some-

times 1 in. diam. *Cymes* glabrous or sparsely hairy, more or less umbellate, usually dense-flowered and rounded, sometimes quite capitate. *Corolla-tube* variable in length, lobes and throat usually densely woolly. *Capsule* ellipsoid, cells about 4-seeded.—In a form (*H. marginata*, Thw. mss., N. 3935), from Kotteyagalla, alt. 5000 ft., the leaves are ciliolate, the flowers in dense heads, the calyx-teeth longer, lanceolate, and the corolla-lobes glabrous except at the base.

17. **H. Gardneri,** *Thwaites Enum.* 142; glabrous, leaves sessile recurved lanceolate acuminate, nerves very indistinct, stipular sheath very broad, panicle erect terminal elongate pyramidal, calyx-tube produced and together with the lanceolate teeth equalling the capsule.

CEYLON; Adam's Peak, *Gardner*.

I have seen but one specimen of this remarkable species, which has much the habit of a South Brazilian *Eryngium*; it consists of a stout cylindric stem 6 in. long, clothed with somewhat corky white remains of the stipules, and bears several subterminal crowded rosettes, about 6 in. diam. of recurved yellowish when dry leaves, and a very stout erect branched panicle, 8 in. high by 4 broad, with distant opposite 3-chotomously divided flowering branches. The panicle is evidently a last year's one, and is white with age. *Leaves* 3–3½ by ½ in., complicate, very coriaceous, their bases concealed by the remains of the large stipules. *Capsules* sessile, turbinate, ⅙ in.

*** *Herbs, all? annual, with terminal panicled or subumbelled cymes, small flowers, and globose capsules; stipules very small.*

18. **H. Wallichii,** *Kurz in Journ. As. Soc.* 1876, ii. 136; a slender sparingly hairy or hispid annual, leaves subsessile ovate or elliptic acute, stipules subulate ciliate, cymes excessively 3-chotomously branched, pedicels long slender, flowers minute, capsule globose with minute calyx-teeth. H. galioides, *Wall. Cat.* 866.

TENASSERIM, *Gomez*, &c.; NICOBAR Islands, *Kurz*.—DISTRIB. Borneo.

Stem trichotomously branched from the base; branches acutely 4-angled, all floriferous. *Leaves* ½–¾ in., in remote pairs, ciliate; nerves few, slender. *Pedicels* spreading, often 2–3-nate. *Flowers* about $\frac{1}{10}$ in. long. *Capsules* ⅛ in. diam., cells about 6-seeded. *Seeds* microscopic, angled, smooth.—Possibly an *Oldenlandia*, but the capsules dehisce septicidally to the base.

19. **H. elegans,** *Wall. Cat.* 887; quite glabrous, very slender, leaves subsessile ovate-lanceolate long acuminate, nerves very obscure, stipules small very broad acute or cuspidate, flowers sessile on the branches of terminal and axillary subumbellate cymes, calyx-teeth obtuse.

TENASSERIM, *Gomez, Helfer*.

Probably perennial, bright green when dry; stem very long and slender, terete, simple or sparingly branched. *Leaves* in distant pairs, 2–4½ by 1–1¾ in., narrowed into short petioles, margins flat. *Cymes* long-peduncled umbellately or 2–3-chotomously branched from above two linear or oblong bracts; branches 1–3 in. long, spreading or divaricate, rather stout. *Flowers* very shortly pedicelled, ⅙ in. long. *Capsules* $\frac{1}{10}$ in. diam., crowned with the triangular obtuse calyx-teeth; cells about 4-seeded.—This resembles a species of Hance, No. 11,230, which has broader less acuminate leaves and pedicelled flowers; also very near the Chinese *H. acutangula*, which has acutely angled stem and sessile leaves.

20. **H. Helferi,** *Hook. f.*; quite glabrous, leaves subsessile ovate obtuse or subacute nerveless margin recurved, stipules small broad, cymes small terminal shortly peduncled, branches short, capsules subsessile, calyx-teeth very short obtuse.

TENASSERIM or the ANDAMAN Islands, *Helfer* (Kew Distrib. 2909).

A small species, black in drying; branches stiff, 4-angled. *Leaves* sometimes

3-nate, 1–1¼ in., midrib distinct beneath; stipules very inconspicuous. *Cymes* small, bracteate, branches 3–6-flowered. *Capsules* as in *H. elegans*.—Certainly closely allied to *H. elegans*, but the habit is very different, the leaves small and not acuminate, black-brown when dry, and the cymes small. Flowers not seen. It approaches Hance's No. 978, from Whampoa, with narrower ciliate leaves.

**** *Herbs or shrubs, cymes axillary (never terminal), sessile or peduncled, dense- or lax-flowered (or flowers solitary in* 27. travancorica); *stipules nearly simple or pectinate.*

21. **H. membranacea,** *Thwaites Enum.* 143; quite glabrous, stem obtusely 4-angled, leaves petioled lanceolate or elliptic-lanceolate acuminate, nerves very slender, stipules free ½-circular pectinate, cymes axillary sessile capitate, calyx-teeth foliaceous oblong-lanceolate very much larger than the small ovary.

CEYLON; at no great elevation, *Walker, Thwaites.*

Stem woody below, stout, subsimple. *Leaves* bright green when dry, 3–6 by ¾–1½ in., rather coriaceous, narrowed into the petiole, margins flat; stipules large. *Heads* ½–1 in. diam., surrounding the stem. *Flowers* (not seen) mixed with chaffy bracts. *Capsules* very small, together with the very large calyx-limb ¼ in. long, cells few or many-seeded.

22. **H. macrophylla,** *Wall. in W. & A. Prodr.* 408; *Cat.* 841; annual, stem acutely 4-angled or -winged, leaves petioled ovate elliptic or lanceolate acuminate, nerves distinct, stipules free broad toothed or pectinate, cymes axillary sessile capitate, calyx-teeth lanceolate as long as the small capsule. H. nodiflora, *Wall. Cat.* 855; *G. Don Gen. Syst.* iii. 526. Scleromitrum tetrandrum, *Kurz in Journ. As. Soc.* 1877, ii. 136. Rondeletia tetrandra, *Roxb. Fl. Ind.* i. 524 (*according to Kurz*). Wendlandia? tetrandra, *DC. Prodr.* iv. 412.

TENASSERIM, *Gomez, Helfer* (Kew Distrib. 2889, 2892). PENANG, *Wallich.* MALACCA, *Griffith* (Kew Distrib. 2889). NICOBAR Islands, *Kurz.*

Stem usually very stout, short, 6–10 in., simple. *Leaves* green or brown when dry, very variable in size and breadth, 3–6 by ½–3 in., sometimes a little rough above; nerves faint; petiole ¼–1 in.; stipules very variously cut, segments sometimes filiform and pubescent. *Heads* often surrounding the stem. *Capsules* small, glabrous or pubescent.

23. **H. Thwaitesii,** *Hook. f.*; stem obtusely 4-angled, leaves petioled elliptic- or ovate-lanceolate acuminate scaberulous above, nerves distinct, stipules pectinate segments long or short hispid, heads axillary sessile capitate, calyx-teeth foliaceous oblong-lanceolate much longer than the small capsule. H. macrophylla, *Thwaites Enum.* 142.

CEYLON; forests about Adam's Peak, *Walker, Thwaites,* &c.

Slender or robust, sparingly branched. *Leaves* 3–8 by 1–2½ in., narrowed into a stout or slender petiole ½–1 in., rather coriaceous, ciliate; stipules ¼–½ in. *Heads* surrounding the stem 1 in. diam. *Capsules* with large calyx ⅓ in. long, cells 3-seeded.

24. **H. nodulosa,** *Arn. Pugill.* 22; hirsute throughout, branches obtusely 4-angled, leaves petioled ovate or lanceolate acuminate flat, nerves distinct, stipules setose, heads axillary sessile, calyx very hairy, teeth subulate-lanceolate equalling or exceeding the hirsute capsule. H. nodulosa, var. β. *Thwaites Enum.* 143. H. axillaris, *Gardn. mss.* (*Thwaites*).

CEYLON; Adam's Peak, Newera Ellia, and Ambagowa, *Walker,* &c.

Branches or stems 1–2 ft., rather stout, shaggy, especially above and at the nodes and petioles with purplish soft spreading hairs. *Leaves* 2–4 by 1–1¾ in., base narrowed or rounded; petiole ¼–1 in.; stipules membranous, connate into a truncate tube with villous bristles. *Heads* very dense. *Corolla-tube* long, glabrous, lobes

lanceolate, mouth woolly. *Capsule* of 2 hard cocci splitting ventrally, each with about 6 angular seeds.—This is certainly Arnott's *H. nodulosa*, who describes it as 2-coccous, and not the *H. nodulosa* α. of Thwaites, which has 4 indehiscent cocci, and is an *Allæophania*.

VAR. *Walkeri*; leaves glabrous above. H. Walkerii, *Arn. in Nov. Act. Acad.* xviii. i. 339; *Walp. Rep.* ii. 493.—Ceylon, *Walker*.

25. **H. cinereo-viridis,** *Thwaites Enum.* 419; slender, much branched, stem obtusely 4-angled, leaves petioled lanceolate acuminate, nerves indistinct, stipules very short cuspidate, cymes opposite on slender peduncles or sessile few-flowered, calyx-teeth triangular-ovate acute or obtuse shorter than the capsule. H. inamœna, *Thwaites l. c.* 143, *partly*.

CEYLON; in the central province, *Thwaites*.

Stem apparently erect; branches acutely 4-angled. *Leaves* green when dry, 2–6 by $\frac{1}{2}$–2 in., narrowed into a petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; cusp of stipules longer than the body. *Peduncles* of cymes in one form $\frac{1}{4}$–2 in. long, in β. of Thwaites 0, with 2 foliaceous bracts under the head. *Flowers* crowded, subsessile. *Capsules* ovoid, smooth, cells 3–4-seeded.

26. **H. albo-nervia,** *Bedd. Ic. Pl. Ind. Or.* t. 3; quite glabrous, much branched, stem obtusely 4-angled, leaves petioled elliptic-lanceolate acuminate, nerves distinct, stipules free deeply pectinate glabrous, cymes small axillary sessile, calyx-teeth lanceolate much longer than the capsule.

TINNEVELLI and TRAVANCORE Mts., alt. 3–4000 ft., rare, *Beddome*.

Very nearly allied to *H. cinereo-viridis*, but differing remarkably in the stipules, the segments of which are sometimes filiform, and in the long lanceolate acuminate calyx-lobes.

27. **H. travancorica,** *Bedd. Ic. Pl. Ind. Or.* 7; quite glabrous, much branched, branches obtusely 4-angled, leaves small petioled elliptic acute or acuminate, nerves indistinct, stipules semi-orbicular pectinate, peduncles axillary capillary 1-fld., calyx-lobes elongate subulate longer than the capsule.

TRAVANCORE and TINNEVELLI Mts., alt. 3–4000 ft., *Beddome*.

A small species; branches woody, divaricating, white when old, youngest only acutely 4-angled. *Leaves* towards the end of the branches, green when dry, $\frac{1}{3}$–1$\frac{1}{4}$ in., rather coriaceous; stipules scurfy. *Peduncles* shorter than the leaves, filiform. *Flowers* solitary, $\frac{1}{3}$ in. long, without bracts. *Calyx-tube* not produced above the ovary. *Corolla* funnel-shaped, glabrous except the woolly mouth. *Capsules* glabrous with stiff erect calyx-teeth, cells few-seeded.

28. **H. hirsutissima,** *Bedd. Ic. Pl. Ind. Or.* t. ii.; woody, robust, branches and leaves beneath hirsute, leaves petioled elliptic-lanceolate acuminate scabrid above, nerves strong beneath, stipules very large connate deeply pectinate, cymes on axillary slender peduncles, calyx-teeth ovate-lanceolate equalling the hirsute capsule.

NILGHERRY Mts.; between Avalanche and Sispara, alt. 7000 ft., *Wight, Gardner, Beddome*.

Stem terete, spreading, short spreading branches densely clothed with stipular scars, as thick as a goose-quill. *Leaves* crowded at the end of the branches, yellow-brown when dry, 1–3 by $\frac{1}{2}$–1 in., very coriaceous; petiole short, stout; stipules sometimes $\frac{1}{2}$ in. diam., coriaceous, hirsute; segments subulate. *Peduncles* shorter than the leaves when bearing flowers only and slender, when bracteate with a branched cyme stouter. *Capsule* globose, cells several-seeded.

***** *Herbs with terminal or terminal and axillary globose dense-flowered cymes, often bracteate or involucrate at the base.*

29. **H. verticillaris,** *W. & A. Prodr.* 409; quite glabrous, stem 0 or very short, leaves rosulate sessile linear-lanceolate acuminate strongly nerved, stipules very long narrow, heads small on axillary 3-chotomously forked bracteate branches, calyx-teeth ovate-lanceolate much longer than the tube. *Wight Ic.* t. 1029; *Wall. Cat.* 6188. H. plantaginifolia, *Arn. Pugill. Pl. Ind. Or.* 22.

NILGHERRY Mts., alt. 7000 ft., *Wight*, &c. CEYLON; in the central province, alt. 7–8000 ft., *Walker*, &c.

Stem as thick as the forefinger, usually inclined and rooting, rarely 1 in. *Leaves* yellow when dry, very numerous, spreading flat on the ground, 3–15 by 1–2 in., straight, longitudinally channelled above and ribbed beneath by the parallel nerves; stipules of the radical leaves hidden, of the branches ½–¾ in., very slender, gland-toothed entire or divided. *Branches* (or peduncle) horizontal or ascending, rather longer than the leaves, naked below, trichotomously forked above with linear bracts at the forks, and below the head. *Heads* ¼–½ in. diam. *Corolla-tube* short, lobes linear, mouth woolly. *Capsule* (not seen) small, cells many-seeded (in Wight's figure).

30. **H. uncinella,** *Hook. & Arn. Bot. Beech. Voy.* 192; erect, glabrous, stem 4-winged, internodes long, leaves sessile or petioled ovate or ovate-lanceolate acuminate, nerves distinct, stipules small broad pubescent gland-serrate or pectinate, heads terminal and axillary globose bracteate, calyx-teeth ovate-lanceolate recurved equalling the glabrous capsule. *Benth. Fl. Hongkong*, 149. H. borreroides, *Champ. in Hook. Kew Journ.* iv. 171. H. cephalophora, *Br. in Wall. Cat.* 842.

KHASIA and JYNTEA Mts.; alt. 4–5000 ft., *Wallich, &c.*—DISTRIB. China.

Root perennial. *Stem* usually simple and erect, stout. *Leaves* 1½–3 by ⅓–1¼ in., smooth or slightly rough above; stipules pubescent, cuspidate, produced into a long point. *Heads* ⅓–¾ in. *Calyx-lobes* glabrous or ciliate. *Corolla-tube* short, glabrous, lobes linear. *Capsule* broadly ovoid, cells about 6-seeded.—I follow Bentham in regarding the Khasian plant as a form of the Chinese, which differs in the narrower often petioled leaves and more pectinate stipules.

SECT. II. **Dimetia.** *Capsule* septicidally splitting into two several-seeded cocci, the top raised and protruding between the calyx-teeth; cocci dehiscing ventrally.—Shrubs usually climbing.

31. **H. Lawsoniæ,** *W. & A. Prodr.* 407 (*not of Wight Ic.* t. 1026); erect, glabrous, branches terete, leaves petioled elliptic-ovate or -lanceolate acute or obtuse, stipules broadly ovate entire, peduncles axillary slender, flowers pedicelled, calyx-teeth very short, top of capsule produced between them.

CEYLON; central province, common between 5–8000 ft.

An erect shrub, variable in habit, greenish when dry. *Leaves* 1–3 in., narrowed into the petiole, pale beneath. *Peduncles* equalling or shorter than the leaves. *Flowers* few, ⅓ in. long. *Calyx-tube* obconic, limb dilated with 5 small teeth. *Corolla* funnel-shaped, glabrous, mouth woolly. *Capsule* urceolate, cells about 4-seeded.—Gardner has collected at Neuera Ellia an abnormal state with obovate convex leaves with revolute margins. Wight's figure of *Lawsoniæ* represents the corolla as 5-fid and the fruit as pubescent, and of a totally different shape from this, with different placentation. It is probably a composite plate, in part of an *Ophiorhiza.* De Candolle's *Wendlandia Lawsoniæ*, founded on *Lawsonia purpurea*, *Lamk.*, which again is founded on the "Pontaletsje" of Rheede (Hort. Mal. iv. t. 57), is a totally different and a Cochin plant, supposed by Wight and Arnott to be identical with this Ceylon one, but differing in the square stems and terminal cymes, and is *H. fruticosa.*

32. **H. capitellata,** *Wall. Cat.* 837 (*excl.* H. fruticosa, *Hb. Rottler*); glabrous, climbing, branches round, leaves shortly petioled ovate- or elliptic-lanceolate acuminate, nerves distinct, stipules very short cuspidate or toothed,

cymes axillary and terminal, flowers capitate, capsule globose, tip produced between the calyx-teeth. *G. Don Gen. Syst.* iii. 527; *Kurz in Journ. As. Soc.* 1877, ii. 135 (*excl. var. γ.*). Oldenlandia rubioides, *Miq. Fl. Ind. Bat.* ii. 353. H. Finlaysoniana, *Wall. Cat.* 6189.

MALAY PENINSULA; from Tenasserim, *Gomez*, to Malacca, *Griffith* (Kew Distrib. 2903, *H. verticillaris*), *Maingay* (Kew Distrib. 890).—DISTRIB. Sumatra, Banca, Borneo, Yunan.

A tall climber, greenish when dry. *Leaves* 2–4 in., quite smooth on both surfaces, nerves slender; stipules transverse, ciliate. *Cymes* pyramidal, branches trichotomous, distant, horizontal. *Heads* $\frac{1}{4}$ in. diam., 8–20-flowered, the flowers sessile and radiating. *Calyx* small, limb cupular 4-toothed. *Corolla* glabrous, nearly 4-partite; segments narrow, bearded within. *Capsules* globose, crown loculicidally and septicidally dehiscing, cells several-seeded.

33. **H. mollis,** *Wall. Cat.* 859; climbing, slender, leaves sessile elliptic-lanceolate acuminate glabrous or hairy above, softly hairy beneath with strong nerves, stipules short connate 2–3-cuspidate, cymes axillary and terminal, flowers umbellulate shortly pedicelled, top of capsule produced between the very short calyx-teeth. *G. Don Gen. Syst.* iii. 527.

PENANG, *Wallich.*

Stem and branches terete, glabrate below, above softly laxly hairy as are the leaves below and young leaves above and cymes. *Leaves* pale and wrinkled when dry, $2\frac{1}{2}$–$3\frac{1}{2}$ in., contracted at the base sometimes into a very short petiole. *Cymes* sessile or shortly peduncled, sparingly branched and few-flowered; umbellules subglobose, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Calyx-teeth* short. *Corolla* deeply divided, lobes linear, glabrous, bearded at the base, as are the bases of the filaments.—Closely allied to *H. capitellata*, as observed by Wallich.

34. **H. scandens,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 364; climbing, glabrous, branches terete, leaves sessile or shortly petioled elliptic or lanceolate acuminate, nerves faint, stipules connate into a short truncate 2-cuspidate cup, cymes terminal, flowers pedicelled, top of capsule produced between the short calyx-teeth. *DC. Prodr.* iv. 422; *Don Prodr.* 134; *Wall. Cat.* 839. H. polycarpa, *Br. and* H. volubilis, *Wall. Cat.* 838, 840.

TROPICAL and SUBTROPICAL Himalaya, alt. 2–6000 ft., from Nipal, *Wallich*, to Sikkim, *J. D. H.* KHASIA MTS. and SILHET, alt. 0–6000 ft., and CHITTAGONG, abundant.—DISTRIB. Upper Birma.

A much-branched climber. *Leaves* 3–5 in., green when dry, sometimes caudate-acuminate, smooth, flat; stipules membranous, ciliolate. *Cymes* spreading, leafy, flat- or round-topped, sometimes puberulous; flowers subumbellate, pedicels $\frac{1}{10}$–$\frac{1}{6}$ in. *Calyx* obconic; teeth ovate, acute or obtuse. *Corolla-tube* short, glabrous, lobes long bearded within. *Capsule* broadly obovoid, crown very prominent, loculicidally gaping, cells many-seeded.

35. **H. viscida,** *Bedd. Ic. Pl. Ind. Or.* t. 4; climbing? glabrous, slender, leaves long-petioled ovate acuminate, nerves slender, stipules small triangular gland-toothed and bracts viscid, cymes axillary and terminal, peduncles and branches very slender, calyx-teeth lanceolate much longer than the capsule, the tip of which is produced between them.

TINNEVELLY; in the beds of mountain streams, alt. 3000 ft., *Beddome.*

A large handsome shrub, branches very slender. *Leaves* green when dry, 3–5 in., membranous, base rounded; stipules green. *Cymes* on filiform peduncles equalling the leaves, branches few subumbellate few-flowered; flowers shortly pedicelled. *Calyx-tube* obconic, lobes long. *Corolla* glabrous, lobes short bearded within.—Beddome figures the stipules as entire, and describes them and the bracts as viscid; the bracts alluded to are no doubt those at the ultimate forks of the cyme, which are stipular.—The ripe fruit is unknown.

36. **H. fulva,** *Hook. f.*; perennial, erect, villous, leaves sessile narrow lanceolate acuminate plaited, nerves 2 pair, stipules membranous with long cilia, cymes glabrous small axillary shortly peduncled, calyx glabrous teeth subulate, tip of capsule produced between them.

KHASIA MTS.; on dry hills near Nurtiung, alt. 4–5000 ft., *J. D. H. & T. T.*

Rootstock woody, sending up strict terete stems a foot high, which and the leaves are bright yellow when dry. *Leaves* 1–1½ in., coriaceous. *Cymes* on short peduncles ¼ in., flowers subcapitate.—This resembles *H. villosa* in many respects, but differs in the strict habit, sessile leaves, with only two pairs of nerves and quite glabrous inflorescence.

37. **H. Griffithii,** *Hook. f.*; woody, branches erect acutely 4-angled puberulous, leaves sessile lanceolate acuminate coriaceous scaberulous nerveless, stipules short cuspidate coriaceous, heads terminal sessile involucrate, calyx-teeth subulate much shorter than the globose glabrous pedicelled capsule which has a large protruded top.

BHOTAN; in woods, alt. 4200 ft., *Griffith* (*Bootan Journal, n.* 318).

An erect shrub, 2 ft. high, with strict stem and branches, nodes distant. *Leaves* 1½–2 in., deflexed, with recurved margins in the fruiting state of the plant, yellowish when dry. *Heads of fruit* globose, ½ in. diam., involucrate by the large upper leaves. *Capsule* smooth, crustaceous, with very many small angular seeds.—A very distinct species, seen in fruit only, the tip of which often exceeds the calyx-teeth; it resembles in habit *H. uncinella*, W. & A.

SECT. III. **Euhedyotis.** *Fruit* indehiscent or tardily dehiscent, or the crown only dehiscing loculicidally.—Herbs, diffuse or subscandent, with usually axillary dense-fld. cymes.

* *Fruit hard, minute, indehiscent; cells few-seeded. Cymes almost all axillary. Leaves usually plaited longitudinally with very strong nerves, rarely flat with slender nerves, never only* 1-*nerved* (*nerves faint in* H. paradoxa)*; stipules ciliate.*

38. **H. vestita,** *Br. in Wall. Cat.* 847; diffuse, villous, leaves petioled elliptic-lanceolate acuminate plaited, nerves 5–7 pair, stipules membranous with long cilia, cymes villous small axillary shortly peduncled, fruit minute globose hairy indehiscent, calyx-teeth subulate. *G. Don Gen. Syst.* iii. 526. H. costata, *Kurz in Journ. As. Soc.* 1877, ii. 135, *not of Wallich.* H. cœrulea, *Korth. in Ned. Kruidkund. Arch.* ii. 160. H. capituliflora, *Miq. Fl. Ind. Bat* ii. 183. Metabolus cœruleus, *Blume Bijd.* 992; *DC. Prodr.* iv. 435. M. lineatus, *Bartl. in DC. l. c.* Spermacoce costata, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 370.

Subtropical SIKKIM and the KHASIA MTS., alt. 1–5000 ft. ASSAM, CACHAR, the MALAY PENINSULA, and PENANG, common.—DISTRIB. Malay and Philippine Islands.

A stout herb, 1–2 ft. long, branches terete. *Leaves* 2–4 in., greenish when dry; stipules villous, with 1–3 subulate processes. *Cymes* inconspicuous, peduncle 0 or ¼–½ in., simple or branched; flowers very small, crowded in heads ⅙–⅓ in. diam., lilac or pink. *Capsules* $\frac{1}{16}$ in.

39. **H. Auricularia,** *Linn.*; *DC. Prodr.* iv. 420; annual, suberect or diffuse, branches glabrous or hirsute especially at the nodes, leaves sessile subsessile or petioled ovate or lanceolate acuminate smooth or scabrid above often pubescent beneath, stipules membranous hairy with long cilia, cymes axillary sessile small very dense-flowered, flowers subsessile, calyx-teeth small shorter than the indehiscent glabrous or hispid fruit. *Roxb. Fl. Ind.* i. 365; *ed. Carey & Wall.* i. 370, *excl. remarks*; *W. & A. Prodr.* 412; *Bedd. Ic. Pl. Ind. Or.* t. 27. H. nervosa, *Wall. Cat.* 857 (*? of Lamk.*). H. procumbens, *Wall. Cat.* 861; H.

lineata, *Wall. Cat.* 6198, *not of Roxb.* H. costata, *Br. in Wall. Cat.* 849; *G. Don Gen. Syst.* iii. 526. H. multicaulis, *Schldl. Pl. Hohen.* No. 845. H. venosa, *Korth. in Ned. Kruidk. Arch.* ii. 160. Metabolus venosus, *Bl.*; *DC. Prodr.* iv. 435. Spermacoce hispida, *Miq. Pl. Hohen.* No. 44. ? S. lineata, *Roxb. Fl. Ind.* ii. 369.—*Rheede Hort. Malab.* x. t. 32.

Throughout eastern Bengal from NIPAL, SIKKIM, and the KHASIA Mts. to ASSAM, CHITTAGONG, MUNEPOOR, BIRMA, and southward to MALACCA, *Maingay* (Kew Distrib. 891, *H. vestita*). WESTERN PENINSULA, from CANARA, southwards. CEYLON, abundant.—DISTRIB. Yunan, Malay Archipelago, S. China, Philippines, Australia.

Branches 6–18 in., terete. *Leaves* usually pale green when dry, 1–3 in.; stipules as in the two previous species. *Cymes* always sessile. *Calyx-teeth* variable.—There are several very distinct looking varieties, but I am unable to define them clearly enough for diagnosis. Wallich's *H. lineata*, from the Deccan (No. 6198), is almost glabrous throughout, as are some Khasian specimens. The stems appear to be erect and woody in Wallich's *H. nervosa* (No. 857), and the calyx-teeth are longer in specimens gathered by Thomson and myself in the Khasia at 4–6000 ft., and at Chittagong and Muneypoor by C. B. Clarke. Some Ceylon specimens have leaves with petiole ½ in., and long caudate points, as in Beddome's figure.

40. **H. lineata,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 365; annual, pubescent, suberect or diffuse, leaves sessile ovate- or elliptic-lanceolate acute or acuminate, stipules membranous villous with one or more long cilia, cymes axillary hispid shortly peduncled, branches few-fld., calyx-teeth much longer than the hispid indehiscent pedicelled fruit. *DC. Prodr.* iv. 420; *Don Prodr.* 134. H. ulmifolia, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 173; *Cat.* 862; *DC. Prodr.* iv. 421.

TROPICAL HIMALAYA of NIPAL and SIKKIM, alt. 1–2000 ft. EASTERN BENGAL, SILHET, CHITTAGONG, and TENASSERIM.

Very similar to *H. Auricularia*, but more finely pubescent, with pedicelled branched cymes ½–¾ in. long, and long calyx-teeth.—I reluctantly postpone Wallich's well-known name of *H. ulmifolia* for Roxburgh's earlier one of *H. lineata*, though there is no convincing evidence of this being Roxburgh's plant; the name has been misapplied to *H. Auricularia* by Wallich.

41. **H. glabra,** *Br. in Wall. Cat.* 848; glabrous, diffuse, stem elongate, leaves subsessile elongate-lanceolate caudate-acuminate membranous, stipules short with long simple or branched cilia, cymes on filiform axillary peduncles puberulous small loosely branched spreading, calyx-teeth much shorter than the glabrous indehiscent globose pedicelled fruit. *Miq. Fl. Ind. Bat.* ii. 183. Spermacoce glabra, *Roxb. Fl. Ind.* i. 368. Knoxia glabra, *DC. Prodr.* iv. 569.

SILHET, *De Silva*. CACHAR, *J. D. H. & T. T.*, &c. BIRMA, *Griffith*. PENANG, *Wallich*, *Maingay*.

Stems 2–3 ft., slender, smooth, terete, fistular; nodes distant. *Leaves* 3–5 by ¼–1½ in., point often almost filiform, nerves slender; stipules with very slender spinous processes sometimes ½ in. long and much branched. *Peduncles* ¼–½ in., bracts small. *Flowers* minute, as are the fruits.

42. **H. paradoxa,** *Kurz in Journ. As. Soc.* 1876, ii. 135; glabrous, branches obtusely 4-angled robust, leaves sessile long linear or linear-lanceolate acute, nerves beneath very faint, stipules membranous with ciliate bristles, cymes capitate axillary globose very dense-flowered, calyx-teeth subulate hispid longer than the globose pedicelled fruit.

SOUTH ANDAMAN ISLAND; Escape Bay, *Kurz*.

Apparently a large species; branches smooth, thick, almost terete. *Leaves* 4–6 by ¾–1 in., narrowed at both ends, flat, nerves very oblique; stipular bristles longer

than the sheath. *Cymes* enclosing the nodes, 1 in. diam. *Fruit* small, crustaceous, smooth; cells about 6-seeded.—I have seen but one specimen, and in fruit only.

** *Capsule crustaceous, rarely coriaceous, loculicidal on the crown only; cells many-seeded; seeds usually angular. Cymes sessile, capitate or few-flowered, axillary or terminal; leaves glabrous or hispid, with one central nerve; stipules with long bristles.*—SCLEROMITRION, W. & A.

43. **H. pinifolia,** *Wall. Cat.* 850; branches acutely 4-angled, angles sometimes hispid, leaves very narrow linear acuminate scabrid above 1-nerved, margins revolute, stipules with many rigid bristles, cymes sessile capitate axillary and terminal, calyx-teeth subulate shorter than the ovoid hispid capsule. *G. Don Gen. Syst.* iii. 525. Scleromitrion rigidum, *Kurz in Journ. As. Soc.* 1877, ii. 136, *excl. Syn. Miquel.*

BEHAR and CHOTA-NAGPORE, alt. 1–2000 ft., *T. Anderson, C. B. Clarke.* MALAYAN PENINSULA, from Pegu and the Andaman Islands to Singapore and Penang. - DISTRIB. Sumatra, Java, Borneo.

A slender diffuse wiry much-branched annual, 4–8 in. high, black when dry. *Leaves* often fascicled, 1–1½ in., spreading and recurved, rigid; stipules very short. *Heads* ¼–½ in. diam., 3- many flowered.—Kurz's *S. rigidum* agrees with this in the form of the leaves, but he describes these as glabrous, wheras they are distinctly scabrid in *H. pinifolia*; he further, by some error, quoted Miquel's Hedyotis rigida (*Fl. Ind. Bat.* ii. 181), a shrubby species described as having lanceolate leaves 6 in. long,

VAR. *cæspitosa*; shorter, branches tortuous, leaves quite glabrous and smooth, much closer set, cymes 1- few-flowered, capsules quite glabrous. Scleromitrion cæspitosum, *Miq. Fl. Ind. Bat. Suppl.* 540. Malacca, *Griffith*; Singapore, *G. Thomson*; Java, *Barnes.*—Possibly a different species.

44. **H. cœrulea,** *W. & A. Prodr.* 412; erect, branches terete puberulous, leaves opposite or fascicled linear-subulate aristate smooth above or scabrid 1-nerved, margins revolute, stipules pectinate with filiform bristles, cymes sessile capitate axillary and terminal, calyx-teeth triangular with hair-points rather shorter than the glabrous capsule. *Bedd. Ic. Pl. Ind. Or.* t. 30. H. pygmæa, *Wall. Cat.* 6199. H. brachiata, *Miq. Pl. Hohenack.* No. 373. H. cyanantha, *Kurz in Journ. As. Soc.* 1876, ii. 136.

WESTERN PENINSULA from Dharwar southwards, and in CEYLON; in sandy places.

A slender strict annual 6–14 in. high, much branched. *Leaves* brown when dry, ½–1½ in., very narrow. *Heads* much fewer-flowered than in *H. pinifolia*, from which the hair-pointed leaves and calyx-teeth well distinguish this.

45. **H. tenelliflora,** *Blume Bijd.* 971; glabrous, diffuse, branches acutely 4-angled, leaves sessile linear-lanceolate acuminate 1-nerved, margins revolute, stipules with long cilia, flowers 1–3 axillary sessile, calyx-teeth rigid ovate or lanceolate equalling the ovoid glabrous capsule. *DC. Prodr.* iv. 419. H. angustifolia, *Cham. & Schlect. in Linn.* iv. 153. H. approximata, *Br. in Wall. Cat.* 852. ? Spermacoce tubularis, *Br. in Wall. Cat.* Scleromitrion tenelliflorum, *Korth. & S.*; tetraquetrum, *Miq. Fl. Ind. Bat.* ii. 185, 186. Oldenlandia angustifolia, *Benth. Fl. Hongk.* 151.

SIKKIM HIMALAYA, *Hb. Griffith.* KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T.* NICOBAR'S, *Kurz.* PENANG, *Wallich.*—DISTRIB. Malay Islands, S. China, Philippines.

Stems much branched, slender, 6–18 in. *Leaves* blackish-brown when dry, 1–2 by ⅙–⅓ in., stiff, pale beneath, stipular hairs often exceeding the capsule. *Calyx-teeth* ciliate, variable in breadth and length.—The smooth surfaces of the very narrow leaves distinguish this from *H. hispida.*

46. **H. hispida,** *Retz Obs.* iv. 23; diffuse, branches and leaves on both surfaces scabrid, leaves sessile elliptic- or linear-lanceolate acute or acuminate

1-nerved, margins recurved, stipules with long cilia, flowers 2–6 in axillary clusters, calyx-teeth triangular about equalling the hispid ovoid capsule. *Roxb. Fl. Ind.* t. 364; *Wall. Cat.* 845. Scleromitrion hispidum, *Korth.*; *Miq. Fl. Ind. Bat.* ii. 185. Oldenlandia hispida, *Benth. Fl. Hongk.* 150.

TROPICAL HIMALAYA, from Chamba and Kangra, *C. B. Clarke.* to SIKKIM and the KHASIA MTS., ASSAM, CACHAR, CHITTAGONG, and the MALAYAN PENINSULA from Tenasserim to Malacca.—DISTRIB. Malay Islands, S. China.

Annual; branches 6–18 in., terete below, 4-angled above. *Leaves* 1½–2½ in., very variable in width, rough and rigid. *Capsule* similar to that of *H. tenelliflora*, but glabrous.

47. **H. nitida,** *W. & A. Prodr.* 412; branches diffuse elongate acutely 4-angled, leaves sessile elliptic- or linear-lanceolate acute scaberulous or smooth above smooth beneath 1-nerved, margins recurved, stipules with long cilia, flowers 1 or few axillary sessile, calyx-teeth triangular erect equalling the glabrous capsule. H. Neesiana, *Arn. Pugill.* 23. H. glabella, *Br. in Wall. Cat.* 886; *Bedd. Ic. Pl. Ind. Or.* t. 36.

WESTERN PENINSULA, from Dharwar southwards to Travancore and CEYLON? TENASSERIM, *Kurz.*

A slender annual, similar in habit to *H. hispida*, but with leaves smooth or sparingly scabrid towards the margins above only, shining and green, and glabrous capsules.—I have seen no Tenasserim specimens, and it is possible that Kurz's plant is *H. hispida*, of which this may be a smooth variety.

*** *Fruit crustaceous, indehiscent; cymes axillary (and terminal in* H. scabra), *sessile, capitate or few-fld.; leaves flat, with or without lateral nerves; stipules triangular, entire or gland-serrate or fimbriate, not bristly; corolla very short.*

48. **H. inamœna,** *Thw. Enum.* 143 *in part*; shrubby, glabrous, erect, 3-chotomously branched, branches subterete, leaves petioled ovate-lanceolate caudate-acuminate nerves arching faint, stipules connate below triangular glandular-pubescent caducous, cymes axillary very short few-flowered subsessile, calyx-limb cup-shaped teeth broad shorter than the smooth fruit.

CEYLON; Adam's Peak, *Thwaites.*

A tall slender shrub, with long slender erecto-patent branches, obscurely 4-angled above, black when dry. *Leaves* dark brownish-green when dry, 3–5 by ⅓–1¼ in., leathery, smooth, with a distinct midrib and faint-arching nerves; stipules short. *Flowers* 3–5, almost sessile, small, glabrous. *Calyx-tube* hemispheric. *Ripe fruit* not seen.—Very like *H. cinereo-viridis*, with which it has been mixed in Herbaria.

49. **H. congesta,** *Br. in Wall. Cat.* 844; robust, glabrous, branches acutely 4-angled, leaves sessile or shortly petioled elliptic or ovate-lanceolate acutely or obtusely acuminate leathery, nerves arching faint, stipules elongate ovate with a long entire serrate or lacerate point, flowers in crowded axillary heads, calyx-teeth broadly triangular obtuse shorter than the ovoid thick smooth fruit. *G. Don Gen. Syst.* iii. 525. H. argentea, *Wall. Cat.* 858.

MALAYAN PENINSULA from Tenasserim to Malacca, *Wallich*, &c.; PENANG, *Maingay.* —DISTRIB. Sumatra, Borneo.

A stout shrub with brachiate branches. *Leaves* pale when dry, 3–5 by 1–2 in., quite glabrous and smooth on both surfaces; stipules sometimes ½ in., coriaceous, segments sometimes branched. *Flowers* clustered, small. *Calyx-tube* hemispheric. *Fruit* subdrupaceous, white.

50. **H. prostrata,** *Korth. in Ned. Kruidk. Arch.* ii. 160; glabrous, branches long flexuous prostrate or scandent? obtusely 4-angled, leaves petioled elliptic-lanceolate acuminate, nerves distinct, stipules elongate coriaceous toothed or subpectinate, cymes axillary small subsessile few-flowered, calyx-

teeth triangular. H. subcarnosa, *Wall. Cat.* 860. Metabolus prostratus, *Bl.*; *DC. Prodr.* iv. 435.

TENASSERIM; Chappedong Hills, *Wallich, Helfer.*—DISTRIB. Java, Borneo.

Stem flexuous, rooting below, sending out long slender flexuous branches with distant internodes. *Leaves* green when dry, 3–4 by ¾–1¼ in., quite smooth, rather membranous, narrowed into a slender petiole ¼–⅓ in.; stipules coriaceous, very variable in length, with glandular teeth, erect or recurved. *Cymes* very small, flowers not seen. *Fruit* small, smooth, cells about 6-seeded. This, though referred in Miquel's Flora to § *Diplophragma*, is certainly a *Euhedyotis.*

51. **H. scabra,** *Wall. Cat.* 880; a low woody herb, branches terete young pubescent, leaves subsessile lanceolate acuminate scaberulous or glabrous, uppermost involucriform, nerves faint, stipules small triangular, cymes terminal (and axillary?) capitate sessile, calyx-teeth triangular-subulate shorter than the small globose glabrous fruit.

MARTABAN and TENASSERIM; Moulmein, *Wallich*; Mergui, *Griffith,* &c.

Very much branched, branches woody, whitish, the younger and leaves dark-brown when dry. *Leaves* 1–2 in., the upper stellately spreading round the cymes, base very acute, very obscurely scabrid; stipules pubescent, teeth few glandular. *Cymes* globose, ⅓ in. diam.; flowers very shortly pedicelled. *Corolla* very small, tube and lobes short. *Fruit* crustaceous, many-seeded, apparently indehiscent, but there is a trace of a loculicidal groove on the crown between the calyx-teeth. Very near a N. Celebes species, which has longer calyx-lobes.

SECT. IV. **Involucrella.** *Fruit* membranous, 2–3-celled, very many seeded, indehiscent, top not protruded between the calyx-teeth.—A herb with a terminal capitate sessile cyme, which is sunk amongst the bases of the involuciform uppermost leaves, stipules membranous with many very long subequal stiff recurved bristles.

52. **H. connata,** *Wall. Cat.* 856; decumbent, branches 4-angled pubescent, leaves sessile oblong or linear-oblong acute coriaceous flat, nerves faint, stipular bristles longer than the sheath, calyx-teeth broadly lanceolate many times longer than the oblong fruit. H. merguensis, *Hook. f. in Gen. Pl.* ii. 57.

TENASSERIM; Tavoy, *Gomez*; Amherst, *Wallich*; Mergui, *Griffith.* ANDAMAN Islands, *Kurz.*

A stout-branched low herb, root woody. *Leaves* 2–3 by ½–1 in., suddenly narrowed at the base, but hardly petioled, puberulous on the faint nerves beneath; stipules connate, bristles ⅓ in. long. *Cymes* quite hidden; flowers mixed with long stipular bracteoles, rarely cymes are formed in the lower axils. *Fruit* often 3-celled, bursting irregularly, walls full of raphides. *Seeds* angular, dotted.

SECT. V. **Anotidopsis.** *Fruit* membranous, rarely crustaceous, 2-celled, indehiscent or obscurely dehiscing loculicidally between the calyx-teeth, crown not protruded between the calyx-teeth.—Herbs or small shrubs, with axillary or terminal sessile or peduncled cymes; stipules membranous, usually bristly.—Habit of *Anotis.*

53. **H. cyanescens,** *Thwaites Enum.* 143; hairy, stems decumbent rooting acutely 4-angled, leaves petioled elliptic-ovate acute membranous nerves distinct, stipules short bristly, cymes axillary dense many-flowered, flowers pedicelled, calyx-teeth lanceolate ciliate many times longer than the membranous many-seeded fruit.

CEYLON; Ambagowa district, *Thwaites.*

An undershrub, often bluish-purple (Thwaites), branches glabrous or hairy. *Leaves* 1–3 by ⅔–1½ in., with short scattered hairs above, more pubescent beneath, flat; nerves 5–6 pair, arched; petiole slender, ¼–⅓ in.; stipules short, membranous,

with short bristles. *Cymes* compound, branches dense. *Flowers* pedicelled, bluish, mixed with linear ciliate bracteoles. *Corolla-tube* and short lobes hairy, mouth not bearded or villous. *Fruit* elongate obconic, apparently indehiscent, very membranous.

54. **H. monocephala,** *Br. in Wall. Cat.* 846 (*corrected from* macrocephala); glabrous or puberulous, flaccid, branched, decumbent, leaves subsessile elliptic-lanceolate acuminate, nerves obscure, stipules slender recurved toothed or pectinate, cymes terminal capitate sessile glabrous, calyx-teeth lanceolate longer than the young fruit.

SILHET, *Wallich.* ASSAM, *Hamilton, Masters*; UPPER ASSAM, *Griffith.*

A slender straggling species, dark brown when dry; branches 4-angled, grooved, the ridges puberulous. *Leaves* 1–1½ in., base very acute, quite glabrous on both surfaces; stipules variable, sometimes of one long recurved very slender simple or cut bristle, at others with 2 or more long bristles. *Cymes* ¼–⅓ in. diam., terminal or rarely on short axillary branches with usually small leaves at their base. *Flowers* quite glabrous, except the corolla-lobes within, larger than in *H. scabra*, but still small. *Ripe fruit* not seen.—An allied plant from Tenasserim or the Andamans (Helfer, Kew Distrib. 2884) is much stouter, with caudate-acuminate leaves. Specimens from Griffith in Herb. Bentham are marked as from Darjeeling, but are probably from Assam. The species was originally found by Hamilton at Birnasherva in 1808 (probably in Assam).

55. **H. stipulata,** *Br. in Wall. Cat.* 6195 and 863 *a*; stems lax diffuse rooting below glabrous or puberulous, leaves ovate or lanceolate acute membranous, nerves slender, stipules with long bristles, cymes capitate sessile or peduncled axillary or terminal glabrous, calyx-teeth lanceolate recurved longer than the membranous broadly globose fruit. H. Lindleyana, *Hook. mss. in W. & A. Prodr.* 409. Oldenlandia japonica, *Miq. in Ann. Mus. Lugd. Bat.* ii. 194. O. hirsuta, *Linn. fil.*; *DC. Prodr.* 127. ? Anotis capitata, *Korth. in Ned. Kruidk. Archiv.* ii. 151.

TEMPERATE HIMALAYA, alt. 3–8000 ft., from Dalhousie to BHOTAN, common. KHASIA MTS., alt. 4–5000 ft.—DISTRIB. Java, Japan.

Branches slender, decumbent, 1–2 ft., terete and leaves dark brown when dry. *Leaves* ⅔–2 in., variable in width, glabrous or with a few soft scattered hairs above and on the nerves beneath, base acute or rounded; petiole ⅙–⅓ in.; stipules cut into filiform bristles nearly to the base. *Cymes* ¼–½ in. diam. *Flowers* quite glabrous, pedicelled. *Fruit* membranous, indehiscent or with a loculicidal fissure on the crown between the calyx-teeth. *Seeds* many, small, angular and pitted.—Very similar to *Anotis ingrata.*

56. **H. Thomsoni,** *Hook. f.*; annual, short, suberect, much branched from the base, leaves fascicled sessile narrow-linear acute margins recurved, stipules forming a short sheath with the petioles bristly, cymes dense in all the axils and terminal, calyx-teeth lanceolate recurved longer than the broadly obconic membranous fruit.

EAST BENGAL; banks of the Megna and Mahanudde, *J. D. H. & T. T.*

Stem very short with fibrous roots, branches suberect 4-angled leafy. *Leaves* ¾–1 by $\frac{1}{10}$ in., spreading and recurved, minutely rough above, midrib strong beneath, rather dilated at the base and united with the stipules into a short membranous sheath, proliferous in the axils; nerves 0. *Flowers* pedicelled. *Corolla* very minute, glabrous, tube and lobes short. *Fruit* apparently quite indehiscent, but there is a loculicidal furrow between the calyx-teeth, pericarp with raphides (as in *H. connata*). *Seeds* very numerous, small, angular, pitted, pale.—A very remarkable little plant, 3–6 in. high, blackish when dry, not found by any previous collector, with the habit of an *Oldenlandia*, but the fruit appears quite indehiscent and the calyx is altogether that of *Hedyotis* and approaches *H. pinifolia.*

ANOMALOUS SPECIES.

57. **H. andamanica,** *Kurz in Journ. As. Soc.* 1872, ii. 311; annual. succulent, stems furfuraceous, short stout, leaves large sessile or short-petioled oblong or ovate-oblong apiculate flat, stipules bristly, cymes terminal 1–3 in. long, peduncles erect, flowers subcapitate, calyx-teeth longer than the corolla-tube and than the small didymous capsule.

SOUTH ANDAMAN and NICOBAR ISLANDS, *Kurz*.

Stems 4–6 in high, erect, simple or branched. *Leaves* 3–5 pair, 1–2½ by ½–1¼ in., membranous, quite glabrous. *Peduncles* 1–2 in., slender, strict, erect, bearing 2–3 small bracteate heads of subsessile flowers. *Calyx-tube* short; teeth large, ovate-lanceolate, recurved. *Corolla* funnel-shaped; tube broad and glabrous; mouth with a few hairs; lobes linear. *Stamens* much exserted, anthers linear. *Capsule* with the crown not protruded, gaping loculicidally. *Seeds* many in each cell, angular, smooth.—Resembles an *Oldenlandia* near *O. nudicaulis*, but the calyx-teeth are close together in fruit, and the seeds, though not ripe, have no appearance of pitting; the corolla, too, resembles that of *Hedyotis*, and the stamens have linear anthers.

21. OLDENLANDIA, *L.*

Slender erect or diffuse di-tri-chotomously branched herbs. *Leaves* usually small and narrow; stipules acute or bristly. *Flowers* small, white or pink, in dichotomous axillary and terminal usually panicled cymes, rarely solitary. *Calyx-teeth* 4, rarely 5, usually erect and distant in fruit, with sometimes alternating teeth. *Corolla* rotate funnel- or salver-shaped, tube short or long; lobes 4, rarely 5, obtuse, valvate. *Ovary* 2-celled; style filiform, stigmas 2 linear; ovules numerous, placentas attached to the septum. *Capsule* small, usually membranous, terete didymous or angled, loculicidal at the top, rarely indehiscent, many-seeded. *Seeds* angled or globose, testa not winged, smooth or pitted; embryo clavate in fleshy albumen.—DISTRIB. Species about 70, tropical and subtropical, chiefly Asiatic.

SUBGEN. I. **Euoldenlandia.** *Corolla-tube* usually short, ovary terete. *Capsule* didymous. *Seeds* numerous, angled, testa smooth.—Herbs, diffuse or branching, usually very slender, stipules with bristles.

* *Peduncles 1–4-fld., from the lower or all the axils.*

1. **O. corymbosa,** *Linn.*; *Hiern in Oliv. Fl. Trop. Afr.* iii. 62; annual, slender, glabrous, rarely scaberulous, leaves linear or narrowly elliptic-lanceolate, margins often recurved nerveless, peduncles solitary 1–4-flowered (rarely 2-nate 1–2-flowered) and pedicels long capillary, calyx-teeth subulate rather shorter than the corolla-tube, crown of capsule low. O. biflora, *Lamk.* (*not of Linn.*); *Roxb. Fl. Ind.* i. 423. O. ramosa, *Roxb. l. c.* 424. O. herbacea, *DC. Prodr.* v. 425 (*not of Linn.*). O. scabrida, *DC. l. c.* O. alsinifolia, *G. Don Gen. Syst.* iii. 529. Hedyotis Burmanniana, *Br. in Wall. Cat.* 868, *in part*; *W. & A. Prodr.* 415; *Dalz. & Gibs. Bomb. Fl.* 116. H. biflora, *Roth Nov. sp.* 92; *Kurz in Journ. As. Soc.* 1877, ii. 133. H. ramosa, *Bl. Bijd.* 973 (? *Wt. Ic.* t. 822). H. intermedia, *W. & A. Prodr.* 415. H. alsinæfolia, *Br. in Wall. Cat.* 873. H. graminicola, *Kurz in Trimen. Journ. Bot.* 1875, 326. Gerontogea biflora, *Cham. et Schl. in Linnæa*, iv. 155.—*Rheede Hort. Mal.* x. t. 38.

An abundant weed throughout INDIA, from the Punjab southward and eastward to Ceylon and Malacca.—DISTRIB. Tropical E. Asia to Java and the Philippines; Trop. Africa and America.

Very variable, not always distinguishable from *O. diffusa* and *O. Heynii*. It varies from a diminutive straggling herb, with branches 1–2 in., to an erect one a foot and more high. *Leaves* from ½–2 by 1/16–⅙ in., erect spreading or recurved, sometimes

as broad as in narrow-leaved forms of *H. pumila*; stipules small, membranous, irregularly-cut, with a long and several shorter teeth or bristles. *Peduncles* rarely in pairs or 4- or more-flowered, or reduced and very short as in *O. brachypoda*. *Capsule* usually broad, didymous, sometimes hemispheric or narrowed below the calyx-teeth, base acute or rounded, crown usually not rising above the base of the calyx-teeth, at others hemispheric and approaching that of *O. Heynii*.—The various forms of this plant are distinguished by botanists as species; but these run so much into one another, that it is impossible to correlate their descriptions exactly with the specimens in Wallich's and Wight's herbaria. *O. scabrida* is a very scabrid form; *O. alsinifolia* a glabrous, broad membranous leaved one, like a short-capsuled *O. pumila*; its tissues are sometimes full of cystoliths, in specimens from Penang, S. India, and N.W. India. I have followed Mr. Hiern in adopting Linnæus' name of *corymbosa*; it is certainly the plant so named in the Linnæan Herbarium, though whether it is that of the "Species Plantarum" is doubtful, in my opinion.

2. **O. diffusa,** *Roxb. Hort. Beng.* 11; *Fl. Ind.* i. 423; annual, diffuse, glabrous, leaves linear nerveless, margins usually recurved, flowers solitary sessile or shortly peduncled, calyx-teeth subulate rather shorter than the corolla-tube, capsule didymous, crown low. *DC. Prodr.* iv. 426. O. brachypoda, *DC. l. c.* 424; *Wall. Cat.* 864. Hedyotis ramosissima, *Kurz in Journ. As. Soc.* 1877, ii. 133. H. diffusa, *Willd. Sp. Pl.* i. 566.

An abundant weed throughout INDIA, from Rohilkund to Ceylon and Malacca.—DISTRIB. Tropical Asia to Borneo, the Philippines, and Japan.

I keep this distinct from *O. corymbosa* on the ground of its being a generally recognised form, more constantly diffuse, always glabrous, with shorter stouter peduncles or pedicels and larger capsules. It is, however, united by many aberrant specimens with that plant.

VAR.? *extensa*; more robust, stems as thick as a crow-quill shining 2 ft. long, leaves often $2\frac{1}{4}$ by $\frac{1}{4}$ in., peduncles longer 1–2-fld., capsule $\frac{1}{6}$ in. diam. Hedyotis extensa, *Br. in Wall. Cat.* 869.—Silhet, *Wallich*, *Griffith* (Kew Distrib. 2910).

VAR? *polygonoides*; perennial-rooted, leaves very small $\frac{1}{4}$–$\frac{1}{3}$ in. narrow. Hedyotis polygonoides, *Wall. Cat.* 872.—Birma, *Wallich*.

3. **O. Heynii,** *Br. in Wall. Cat.* 867, *partly* (Hedyotis); annual or biennial, glabrous, erect, much branched, leaves linear- or linear-lanceolate nerveless, margins usually recurved, peduncles solitary capillary 1-flowered, calyx-teeth subulate much shorter than the slender corolla-tube, capsules didymous globose or ovoid, crown much protruded. O. herbacea, *Willd.*; *Roxb. Fl. Ind.* 424 (? of Linnæus). ? O. linearis, linifolia, and asperula, *DC. Prodr.* iv. 425. Hedyotis Heynii, *W. & A. Prodr.* 416; *Dalz. & Gibs. Bomb. Fl.* 116.—*Rheede Hort. Mal.* x. t. 23.

Mountainous part of INDIA from Kumaon, alt. 5500 ft., to the Khasia Mts., alt. 4000 ft., and southward to Ceylon; not found in the Malay Peninsula or the Eastern Himalaya.—DISTRIB. Malay Islands, Tropical Africa.

Usually a taller stricter much more robust plant than *O. corymbosa*, with a longer more ovoid capsule, having a much protruded crown and usually 1-flowered solitary or 2-nate filiform peduncle equalling the leaves; but these characters are far from constant, and in some examples the flowers are panicled towards the ends of the branches as in the next subsection. The name *Heynii* may have to give place to some of the synonyms cited, if ever these are cleared up.

4. **O. crystallina,** *Roxb. Hort. Beng.* 11; *Fl. Ind.* i. 422; annual, glabrous, branches low diffuse leafy, leaves elliptic- or elliptic-lanceolate subacute flat, peduncles solitary 1–2-fld. filiform equalling the leaves, calyx-teeth triangular-lanceolate, bases touching in fruit, a little shorter than the corolla-tube, capsule obovoid, crown low. *DC. Prodr.* iv. 426. O. pumila, *DC. l. c.* 425. Hedyotis pumila, *Linn. f.*; *Wall. Cat.* 6200, *chiefly*; *W. & A. Prodr.* 414.

Not uncommon in the PLAINS of INDIA from Rohilkund southwards and eastwards, but local. EAST BENGAL, *Griffith* (Kew Distrib. 2912). CHITTAGONG, *C. B. Clarke.* DECCAN not uncommon. (Not found yet in East Himalaya, Assam, the Khasia or Malay Peninsula).—DISTRIB. Java.

A diffuse flaccid herb; branches 2–3 in. *Leaves* ½–⅔ in.—The large calyx-teeth well distinguish this from any of the foregoing species. The tissues are sometimes full of raphides, as in some states of *O. corymbosa.*

** *Peduncles from the upper axils chiefly, many-flowered.*

5. **O. umbellata,** *Linn.*; *DC. Prodr.* iv. 425; annual, diffuse, glabrous or scaberulous, leaves often fascicled linear flat or almost acicular with recurved margins acute nerveless, peduncles in the upper axils stout 3-many-flowered, pedicels short, calyx-teeth a little shorter than the corolla-tube subulate, capsule didymous, crown low. *Roxb. Cor. Pl.* t. 3; *Fl. Ind.* i. 421. O. puberula, *G. Don Gen. Syst.* iii. 530. Hedyotis umbellata, *Lamk.*; *W. & A. Prodr.* 413, *excl. some synonyms*; *Wall. Cat.* 871. H. linarifolia and puberula, *Wall. Cat.* 870 and 884.

WESTERN PENINSULA, from Orissa southwards, *Roxburgh,* &c. CEYLON, common. —DISTRIB. N. Birma, *Kurz.*

Stem woody, much branched from the base. *Leaves* ½–1½ in., spreading or recurved. *Cymes* sometimes sessile and terminal. *Capsules* much as in *O. corymbosa.*

6. **O. Wightii,** *Hook. f.*; perennial, scabrid, stem woody flexuous, branches rigid diffuse leafy, leaves squarrose linear-lanceolate acuminate, margins revolute, peduncles chiefly in the upper axils strict with terminal capitate cymes, calyx-teeth triangular-lanceolate pungent equalling the broad hemispheric didymous capsule.

WESTERN PENINSULA, *Herb. Wight* (Kew Distrib. 1511).

Stems creeping in red soil or prostrate, several inches long; branches 4–6 in., tufted, erect or ascending. *Leaves* ½–1 in., sessile, pungent, scabrid on both surfaces; stipules short, bristly. *Peduncles* usually exceeding the leaves, stout, scabrid. *Heads* ¼ in. diam.; flowers sessile. *Capsules* large, scabrid, with a broad low crown and long spreading teeth.—This approaches a *Hedyotis* of the section *Scleromitrion,* but the foliage is not that of the majority of that group, and the form of the capsule and distant calyx-teeth well distinguish it.

*** *Flowers sessile, chiefly in the upper axils, solitary or crowded; corolla rotate.* (*See also* 2. O. diffusa.)

7. **O. trinervia,** *Retz Obs.* iv. 23; annual, glabrous or hairy, branched low diffuse leafy, leaves small subsessile ovate elliptic or orbicular, nerves distinct, flowers solitary or clustered in the axils sessile or subsessile, calyx-teeth very short equalling the rotate corolla, capsule small didymous hairy crown low. O. repens, *Burm. Fl. Ind.* t. 15, f. 2? Hedyotis trinervia, *W. & A. Prodr.* 414; *Dalz. & Gibs. Bomb. Fl.* 115; *Bedd. Ic. Pl. Ind. Or.* t. 29. H. rotundifolia, *DC. Prodr.* iv. 420. H. serpyllifolia, *Poir. in DC. l. c.* 421. H. orbiculata, *Heyne*; *Wall. Cat.* 6191.

WESTERN PENINSULA, from the Concan southwards. CHITTAGONG, *J. D. H. & T. T.* ARRACAN, *Kurz.* CEYLON.—DISTRIB. Sumatra, Java, Tropical Africa.

A flaccid green weed, with straggling branches. *Leaves* ¼ in., rarely more, ¾ in a Pondicherry specimen, and more ovate and petioled. *Stipules* 2-partite, segments acuminate. *Corolla* purplish.

**** *Flowers partly in axillary peduncles, chiefly in open terminal panicled cymes.*

8. **O. brachiata,** *Wight in W. & A. Prodr.* 416 (Hedyotis), and *Wall. Cat.* 6201, *in part*; annual, glabrous, very slender, stem erect acutely 4-angled,

leaves slender narrow-linear, peduncles capillary solitary axillary and 1-flowered and in open dichotomous terminal cymes, calyx-teeth subulate rather shorter than the corolla-tube, capsules small broadly didymous, crown low. O. pusilla, *Roth*; *DC. Prodr.* iv. 428. Hedyotis angustifolia, *Wall. Cat.* 6203. H. attenuata, *Willd.*; *Herb. Madr.*, *in part.*

ROHILKUND, *Royle, T. Thomson.* BEHAR, *Hamilton.* WESTERN PENINSULA, *Wight*, &c.

A very slender erect species, resembling a state of *O. biflora*, with paniculate terminal inflorescence.—According to the rules of priority, the name of *O. pusilla* should take precedence, but it is not applicable.

9. **O. dichotoma,** *Koen.*; *Roth Nov. Sp.* 93 (Hedyotis); annual, very slender, glabrous or sparsely hairy, stem erect terete, nodes distant, branches filiform, leaves linear-lanceolate acute flat nerveless, peduncles capillary axillary and in open terminal panicles, pedicels very long, calyx-teeth subulate much shorter than the slender corolla-tube, capsule globose. O. linarifolia, *Herb. Madr.* O. affinis, *DC. Prodr.* iv. 428. Hedyotis dichotoma, *Wall. Cat.* 6204, *in part*; *W. & A. Prodr.* 416 (*excl. some synonyms*). H. affinis, *Roem. & Sch.* H. Heynii, *Bedd. Ic. Pl. Ind. Or.* t. 33 (*not Br.*).

BANDELKUND and southward through the WESTERN PENINSULA to Travancore, on dry hills, alt. 1–3000 ft., *Rottler*, &c.

Stem simple in small plants, much branched in large ones, 18 in. high; branches shining, divaricating, copiously flowering throughout their length, ultimate ones and peduncles and pedicels like fine hairs, 1 in. and more long. *Flowers* very minute. *Capsules* smaller than in its congeners, cells about 6-seeded.—Beddome's figure is, I think, this plant; it does not agree with his description, called *H. Heynii* (t. 33).

10. **O. arguta,** *Br. in Wall. Cat.* 864 (Hedyotis); annual, erect, stiff, stem simple or 3-chotomously branched furfuraceous or hispid, leaves semi-amplexicaul subulate or triangular-lanceolate acuminate scabrid, margins revolute, cymes terminal lax few-flowered scabrid, peduncles and pedicels filiform, calyx-teeth subulate-lanceolate shorter than the funnel-shaped corolla-tube and longer than the didymous hemispheric hispid capsule. Hedyotis linoides, *Griff. Notul.* iv. 265; *Kurz in Journ. As. Soc.* 1877, ii. 134.

MARTABAN and TENASSERIM; Moulmein, and Mergui, in wet sand, *Gomez*, &c.

A few inches to a span high; branches terete, spreading. *Leaves* ½ in., rigid, pale beneath. *Cymes* twice or thrice forked; flowers blue. *Seeds* ellipsoid, angled, testa smooth.

11. **O. Stocksii,** *Hook. f. & T. Herb. Ind. Or.* (Hedyotis); tufted, glabrous, stems filiform simple or branched above, leaves subulate, stipules with bristles, cymes with few very large flowers, calyx-teeth elongate subulate almost equalling the very broadly campanulate corolla-tube.

MALABAR; in the Bababooden hills, *Stocks, Law.*

A very slender annual, apparently growing in masses amongst grass, 4–8 in. high. *Stems* simple below or throughout their length, branches ending in di-trichotomous cymes, with capillary pedicels. *Leaves* (not fascicled) $\frac{1}{6}$–$\frac{1}{2}$ in. *Calyx-tube* short, obconic, much smaller than the long erect or recurved teeth. *Corolla* much the longest of the genus, quite campanulate, blue, $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Capsules* hemispheric or turbinate, smooth.

SUBGEN. II. **Kohautia.** *Corolla-tube* usually long cylindric or funnel-shaped, with included or shortly exserted anthers. *Ovary* terete. *Seeds* numerous, angled.—Usually strict erect, annual or perennial herbs, rarely diffuse, sometimes shrubby below with stiff erect branches, very narrow leaves and terminal open cymes; stipules with bristles.

* *Corolla-tube very slender.*

12. **O. aspera,** *DC. Prodr.* iv. 428; stems stout and branches scabrid, leaves in fascicled whorls erect narrow-linear acute margins revolute, stipules with median bristles, capsules solitary or 2–3-nate subsessile on the slender erect branches of the cymes rough globose didymous, calyx-teeth subulate shorter than the corolla-tube. Hedyotis aspera, *Heyne in Roth Nov. Sp.* 94; *W. & A. Prodr.* 417; *Dalz. & Gibs. Bomb. Fl.* 115. H.? elongata, *Br. in Wall. Cat.* 865; *G. Don Gen. Syst.* iii. 527.

THE PUNJAB, *Aitchison.* ROHILKUND, and southwards to MYSORE, *Rottler*, &c.–DISTRIB. Tropical Africa.

A stout annual herb, 6–8 in. high, trichotomously branched. *Leaves* 2–3 in., glabrous above, coriaceous. *Cymes* branched in fruit, 1–6 in. long; flowers small, pale blue, $\frac{1}{6}$ in. long, corolla about $\frac{1}{10}$ in. diam. *Capsules* $\frac{1}{6}$ in. diam.

13. **O. ?senegalensis,** *Hiern in Oliv. Fl. Trop. Afric.* iii. 56; glabrous or minutely scaberulous, stem extremely slender erect simple, leaves not fascicled linear-lanceolate acuminate flat or with recurved margins, stipules with lateral bristles, cymes in a very loose open terminal panicle with divaricate very long capillary peduncles and pedicels, calyx-teeth subulate much shorter than the slender corolla-tube, corolla-lobes acuminate, capsules hemispheric. Kohautia senegalensis, *Endl. Atakt.* t. 23.

CHOTA NAGPORE; Hazaribagh, alt. 2200 ft., *C. B. Clarke.*—DISTRIB. ? W. Tropical Africa.

Annual, 8–16 in. high; stem wiry, terminating in a wide spreading very thin very few-flowered pyramidal paniculate cyme, with capillary pedicels 1–2 in. long. *Flowers* very small. *Capsules* $\frac{1}{8}$ in. diam., the minute subulate teeth very distant. Easily confounded with *O. dichotoma*, but distinguished by the divaricate cyme-branches, corolla, and larger capsules. I refer it with hesitation to the Senegal plant, which has an equally open pyramidal cyme and long-pedicelled flowers, and of which there is a variety with sessile or short pedicelled flowers. The corolla is much shorter in the Indian plant, but the specimens are too few for a strict comparison.

14. **O. retrorsa,** *Boiss. Fl. Or.* iii. 12; stem retrorsely scabrid, leaves in fascicled whorls short linear-oblong obtuse flat scabrid, stipules with median bristles, cymes glabrous spreading, capsules sessile and pedicelled didymous, calyx-teeth much shorter than the long slender corolla-tube, corolla-lobes short.

SCINDE; near Kurrachee, *Stocks.*—DISTRIB. Arabia.

Stock woody, branched from the base; branches 12–18 in., slender. *Leaves* $\frac{1}{4}$–1 in.; nerves indistinct. *Flowers* scattered on the long cyme-branches. *Corolla-tube* $\frac{1}{2}$ in., glabrous. *Capsule* $\frac{1}{8}$ in. diam., glabrous.

15. **O. gracilis,** *DC. Prodr.* iv. 431 (Kohautia); stem below scaberulous or glabrate, leaves not fascicled narrow linear acuminate glabrous flat, stipules truncate, cyme-branches slender, capsules pedicelled obovoid globose or hemispheric, corolla-lobes linear. Hedyotis gracilis, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 371; *Cat.* 843. H. stricta, *Wall. in As. Res.* xiii. 369. H. fusca, *Ham. in Don Prodr.* 134. H. aspera, *Bedd. Ic. Pl. Ind. Or.* t. 32. Kohautia sp., *Griff. Notul.* iv. 265; *Ic. Pl. Asiat.* t. 477.

Hilly districts of India. TROPICAL HIMALAYA, alt. 1–5500 ft., from Garwhal to Sikkim, Birma, and plains of N. BENGAL. BELGAUM, *Ritchie*; TRAVANCORE, *Beddome.*—DISTRIB. Ava.

Slender, erect, 6–12 in., sparingly branched. *Leaves* erect, 2–3$\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{4}$ in.; nerves indistinct. *Cyme-branches* spreading in flower, erect in fruit; pedicels very slender. *Corolla* $\frac{1}{3}$ in., brown. *Capsules* very variable in length, $\frac{1}{6}$–$\frac{1}{4}$ in.

16. **O. stricta,** *Linn. Mant.* 200; slender, glabrous, diffusely branched, leaves from linear-lanceolate and flat to almost filiform with recurved margins, stipules truncate, cyme-branches long slender, calyx-teeth subulate not equalling

the short corolla-tube, capsules pedicelled small obovoid. Hedyotis maritima, *Wall. Cat.* 6192, *in part*; *W. & A. Prodr.* 417. H. graminifolia, *Linn. f. Suppl.* i. 119. O. graminifolia and O. linifolia, *DC. Prodr.* iv. 425.

Sandy sea-coasts of TINNEVELLY and S. CARNATIC, *Rottler*, *Wight*, &c. CEYLON, common near the sea.

Annual, repeatedly trichotomously branched from the base, 4 in.–2 ft. high; branches very slender, ending in wiry raceme-like cymes with distant flowers. *Leaves* 1–2 in., very variable, sometimes membranous and $\frac{1}{2}$ in. broad. *Flowers* all pedicelled. *Corolla-tube* funnel-shaped, $\frac{1}{8}$ in. *Capsules* $\frac{1}{8}$ in. long or less.

17. **O. Shuteri,** *Hook. f.*; branches stout woody below ascending sparingly divided, leaves short linear-lanceolate scabrid above, margins revolute, stipules truncate, cyme-branches short stiff, calyx-teeth subulate shorter than the cylindric corolla-tube, capsules pedicelled small ovoid. Hedyotis maritima, *Wall. Cat.* 6192, *in part*; *Wight Cat.* 1314.

MADRAS, *Shuter*, *Wight*.

Very different from *O. stricta*, with which it is mixed in Herb. Wallich; much stouter, with scabrid rigid leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long and abbreviated cymes, in which the capsules are sometimes almost crowded into heads; the corolla-tube, too, appears to be cylindric- not funnel-shaped.

18. **O. coccinea,** *Royle Ill.* 241, t. 53 (Kohautia); very slender, erect, scaberulous, leaves opposite not fascicled narrowly linear-lanceolate acute margins recurved, stipules bristly, cymes sparingly branched few-flowered, calyx-teeth very long equalling or shorter than the cylindric corolla-tube, capsules oblong or subglobose.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 3–8000 ft., *Royle*, &c.

Annual; stem 12–18 in., simple below or throughout its length; branches erect, terminating in long-peduncled cymes. *Leaves* in distant pairs, 1–2 by $\frac{1}{10}$–$\frac{1}{6}$ in., rough to the touch. *Flowers* subsessile, pedicels lengthening in fruit. *Corolla* scarlet, tube $\frac{1}{8}$ in., lobes oblong. *Capsules* very variable, $\frac{1}{8}$–$\frac{1}{4}$ in. long, often shorter than the slender calyx-teeth.

SUBGEN. III. **Gonotheca.** *Calyx-teeth* short, broadly triangular, very small in fruit. *Corolla-tube* short. *Ovary* terete, 4-angled or 4-winged. *Seeds* numerous, subglobose, testa deeply coarsely pitted.

19. **O. paniculata,** *Linn.*; *Burm. Fl. Ind.* 38, t. 15, f. 1; annual, glabrous, branches erect or ascending succulent, leaves petioled elliptic-ovate or oblong subacute flat, stipules truncate with median points or bristles, cymes 3–8-fld. subterminal, calyx-tube not produced above the ovary, capsules on slender pedicels didymous. *DC. Prodr.* iv. 427. O. alata, *Roxb. Fl. Ind.* i. 421 (*not of Koenig*). O. multiflora, *Cav. Ic.* vi. 53, t. 574, f. 2. O. racemosa and ramosissima, *Bl. Bijd.* 972. Hedyotis racemosa, *W. & A. Prodr.* 414; *Wt. Ic.* t. 312; *Wall. Cat.* 865, *in part.* H. paniculata, *Dcne.*; *Kurz in Journ. As. Soc.* 1877, ii. 134. H. minima, *Heyne*; *Wall. Cat.* 877.

EASTERN BENGAL, SIKKIM, ASSAM, SILHET, PEGU, the MALAY PENINSULA, the CARNATIC, and CEYLON.—DISTRIB. Birma, Malay, and Philippine Islands, China, Polynesia.

Stout or slender, succulent, 6–18 in. high, erect or diffuse, branched from the base; branches obtusely 4-angled, robust or slender. *Leaves* $\frac{1}{2}$–3 by $\frac{1}{4}$–$1\frac{1}{4}$ in., bright green, soft, nerves indistinct, narrowed into the short or long petiole. *Cymes* in the upper axils, short, 3–8-fld., panicled, peduncles and pedicels stout or slender. *Flowers* minute, white. *Capsules* very variable, $\frac{1}{8}$–$\frac{1}{6}$ in. diam., turbinate didymous or hemispheric, terete or 4-ribbed, membranous; crown usually exceeding the calyx-teeth.—A very variable weed, sometimes erect, with stem and lower branches as stout as a

goose-quill, at others slender and diffuse; cymes and fruit especially variable, the former in slenderness and length, the latter in size and shape. There are no specimens of *H. paniculata* in Herb. Linn., but as Burman's figure of what he assumes to be Linnæus' plant is a fair one, I have adopted the name. Roxburgh's *O. paniculata*, from the Moluccas, with rooting stems and biennial root, must be a different plant. Lamarcks' *H. racemosa*, usually cited under this, is figured as having smooth seeds, and is therefore a *Eu-oldenlandia*. *H. minima*, Heyne (Wall. Cat. 877), is a seedling state, apparently, of this species.

20. **O. biflora,** *Linn.*; *W. & A. Prodr.* (Hedyotis); annual, glabrous, diffuse, succulent, leaves petioled elliptic or oblong acute or subobtuse flat, stipules truncate with a few points or short bristles, cymes short 1–4-fld., calyx-tube not produced above the ovary, capsules shortly pedicelled turbinate 4-angled base acute. Hedyotis biflora, *Wall. Cat.* 879.

CARNATIC, *Rottler*, *Wight*, &c. CEYLON, *Gardner*, *Keelart*.

This very closely resembles small specimens of *O. paniculata*, and is distinguished by the cymes seldom having more than 3 flowers, and often reduced to 1, and by the larger fruit, more turbinate and angled, and with usually larger calyx-teeth.—This Brown declares to be the true *O. biflora* of Linnæus, not that of Roxburgh and De Candolle, which is *O. corymbosa*.

21. **O. alata,** *Koen. in W. & A. Prodr.* 413 (Hedyotis); glabrous, succulent, branches stout, leaves subsessile elliptic or elliptic-lanceolate subacute or obtuse, stipules truncate toothed, cymes axillary subcapitate, calyx-tube 4-winged produced above the ovary and cupular, capsule large turbinate 4-angled and -winged. O. pterita, *Miq. Fl. Ind. Bat.* ii. 193. Hedyotis alata, *Koen. in Wall. Cat.* 6196. H. pterita, *Bl. Bijd.* 972. Gonotheca Blumei, *DC. Prodr.* iv. 429; *Endl. Atakt.* t. 22.

CIRCARS, *Rottler*, *Roxburgh*, *Wight*.—DISTRIB. Malay Islands.

A stout annual, 6–12 in. high, with the habit of branching and foliage of *O. paniculata*, but the leaves are almost sessile, the cymes reduced to axillary and terminal heads, and the capsules are much larger, ⅓ in. long, very shortly pedicelled, surmounted by a cupular 4-lobed prolongation of the calyx-tube, and has 4 lateral wings, of which 2 are shorter than the others.—The cellular tissue is full of raphides.

22. **O. nudicaulis,** *Roth Nov. Sp.* 95; annual, erect, sparsely hairy, stem furfuraceous short naked or with 2 leaves below, leaves 4 in a whorl rarely opposite large membranous elliptic or ovate, nerves distinct, cymes long-peduncled fascicled terminal much dichotomously branched, branches capillary, calyx-teeth minute subulate or shorter than the corolla-tube obscure in fruit, capsule hemispheric. O. rotundifolia, *G. Don Gen. Syst.* iii. 530. O. ovatifolia and spergulacea, *DC. Prodr.* iv. 427, 428. Hedyotis scapigera, *Br. in Wall. Cat.* 881. H. nudicaulis, *W. & A. Prodr.* 416; *Bedd. Ic. Pl. Ind. Or.* t. 34. H. ovatifolia, *Cav. Ic.* 573. H. rotundifolia, *Ham. in Wall. Cat.* 6190 (*not of DC.*). H. spergulacea, *Kurz in Journ. As. Soc.* 1877, ii. 134.

TROPICAL HIMALAYA, from Kumaon to Sikkim, the KHASIA MTS., and ASSAM, ascending to 5000 ft. TRAVANCORE and MAISOR. (Not in Ceylon.)—DISTRIB. Java.

Much resembling *Mollugo nudicaulis* in the inflorescence. *Stem* stout, erect, 1–2 in., with or without a pair of small leaves, naked to the first whorl of leaves, simple or 3-chotomously forked, each branch usually bearing 4 unequal leaves in a whorl. *Leaves* shortly petioled, ¾–2 in., tip obtuse or rounded. *Cymes* very open; flowers very small, as are the capsules.

23. **O. Parishii,** *Hook. f.*; annual, very slender, sparsely hairy, stem short simple, leaves petioled ovate acuminate membranous, cymes terminal dichotomous open few-flowered, peduncles and pedicels capillary, calyx-teeth minute

much shorter than the campanulate corolla, capsule broadly turbinate, crown hemispheric.

MARTABAN; at Moulmein, *Lobb, Parish.*

Whole plant 4–6 in., very flaccid; stem almost filiform. *Leaves* $\frac{3}{4}$–$1\frac{1}{2}$ in.; petiole very slender. *Cymes* shortly peduncled, terminal, with sometimes very reduced ones in the lower axils. *Capsules* the smallest of the genus, with very obscure calyx-teeth.

DOUBTFUL INDIAN SPECIES.

O. CAPILLARIS, *DC. l. c.* 426, is probably *O. corymbosa*, L.

O. LACTEA, *Cham. & Schlecht. in Linnæa*, 1829, 159 (Gerontogea); *DC. l. c.* 427, is quite undeterminable.

O.? HISPIDA, *DC. l. c.* 428. Hedyotis hispida, *Roth Nov. Sp.* 95, is also undeterminable.

O.? DEPRESSA, *Willd. Sp.* i. 675; *DC. l. c.* 429. Hedyotis depressa, *Roem. & Sch.*, is probably *O. corymbosa.*

22. **ANOTIS,** *DC.*

Herbs, prostrate or ascending, rarely erect; stipules usually membranous or with marginal bristles. *Calyx-tube* short; lobes 4, with broad intervening sinuses. *Corolla* tubular or funnel-shaped; lobes 4, usually shorter than the tube, valvate in bud. *Stamens* 4, on the mouth of the corolla; anthers included or exserted. *Ovary* 2- rarely 3–4-celled; style filiform, stigmas 2–4 linear; ovules few or rarely solitary in each cell, on placentas ascending from near the base of the septum. *Capsule* didymous or laterally compressed, crown produced between the calyx-lobes, loculicidally 2-valved at the top, rarely indehiscent, cells 1- or few-seeded. *Seeds* peltate boat-shaped or rarely plano-convex, testa very rarely winged, coarsely pitted; embryo clavate in horny albumen.——DISTRIB. Species about 25, tropical Asiatic and Australian, with 1 American.

SECT. I. **Euanotis.** *Capsule* turgid, dehiscing loculicidally by a broad top above the calyx-teeth.

* Perennials.

1. **A. ingrata,** *Wall. Cat.* 863, *in part* (Hedyotis); root perennial, branches stout elongate diffuse glabrous or hairy at the nodes, leaves petioled ovate-lanceolate acuminate puberulous above and beneath, nerves numerous, stipules with many long bristles, cymes terminal and subterminal, flowers crowded, calyx-teeth large, capsules shortly pedicelled hemispheric didymous, cells many-seeded. Hedyotis stipulata, *Br. in Wall. Cat.* 6195, *in part.*

Moist places in the TEMPERATE HIMALAYA, from Nipal, *Wallich*, to Bhotan, *Griffith*, alt. 4–8000 ft. KHASIA MTS., alt. 4–6000 ft.

Stem 2–3 ft., straggling, rooting at the nodes below, brittle. *Leaves* $1\frac{1}{2}$–3 in., membranous, blackish when dry; nerves 8–10 pair; stipular bristles hairy, $\frac{1}{3}$ in. *Flowers* shortly pedicelled, white. *Corolla-tube* $\frac{1}{6}$ in. long, broad, lobes oblong, glabrous or hairy. *Capsules* glabrous or hairy.—Whole plant fœtid.

2. **A. gracilis,** *Hook. f.*; very slender, diffuse, stem glabrous or pubescent, leaves petioled ovate acuminate sparsely hairy above and beneath, stipules bristly, cymes axillary and terminal once or twice unequally 2–3-chotomously forked with capitate clusters of glabrous flowers, calyx-teeth lanceolate recurved.

TEMPERATE SIKKIM and E. NIPAL, alt. 5–6000 ft., *J. D. H.* KHASIA MTS., at Moflong, alt. 5–6000 ft., *J. D. H. & T. T.*

A very slender perennial, with the stem rooting for a considerable length; internodes long. *Leaves* 1–$1\frac{1}{2}$ in., membranous, dark above when dry, paler beneath,

nerves 6–8 pair. *Cymes* on slender peduncles much longer than the leaves; heads of flowers ¼ in. diam. *Corolla* white, glabrous; tube broad, much longer than the lobes.—Fruit unknown.

3. **A. Leschenaultiana,** *W. & A. Prodr.* 411 (Hedyotis); root perennial, branches diffuse ascending villous or glabrate, leaves sessile or petioled ovate obtuse or acute more or less hairy or hirsute above and beneath, stipules bristly, cymes terminal corymbose hispid or glabrous, capsule subglobose didymous with the calyx-teeth near the top, cells 1–8-seeded, seeds deeply pitted.

Throughout the mountains of the WESTERN PENINSULA, from the Concan to Travancore, alt. 4–7000 ft.

A most variable plant in habit, stature, hairiness, and length of the calyx-teeth, which often enlarge and are sometimes somewhat toothed after flowering. There are three principal forms.

VAR. 1. *Leschenaultiana proper*; stout, stems often villous 1–2 ft., leaves 1–2 in. ovate or ovate-lanceolate often cordate and sessile, cymes 2–4 in. diam., calyx-teeth usually short.—Hedyotis Leschenaultiana, *Wt. Ill.* t. 125; *Dalz. & Gibs. Bomb. Fl.* 115.

VAR. 2. *affinis*; smaller, more slender, stem 4–8 in. usually almost hispid, leaves ½–¾ in. petioled coriaceous ovate, cymes 1–2 in. diam., calyx-teeth often very long.—H. affinis, *W. & A. Prodr.* 411; *Wt. Ic.* t. 1030. H. cymosa, *Br. in Wall. Cat.* 885.

VAR. 3. *deltoidea*; dwarf, glabrous or sparsely hispid, leaves ½–¾ in. coriaceous petioled ovate obtuse. H. deltoidea, *W. & A. Prodr.* 410.

4. **A. decipiens,** *Hook. f.*; perennial, stems elongate slender diffusely branching and leaves sparsely pilose, leaves petioled ovate acuminate flat membranous, stipules with long bristles, cymes terminal and axillary subpaniculately branched many-flowered puberulous or glabrate, capsules small subglobose didymous, crown shorter than the lanceolate calyx-teeth, cells 1–3-seeded.

WESTERN PENINSULA; Concan, *Stocks*; Travancore and Pulney Mts., *Wight*.

Habit of glabrate slender forms of *H. Leschenaultiana*, but the leaves have petioles ½–1 in.; the cymes are not at all corymbose, the branches being very unequal. The capsules much resemble those of *A. monosperma* at first sight, but are more hemispheric, didymous, and dehisce across the cells between the calyx-teeth. *Corolla* nearly ¼ in. long, tube narrowly funnel-shaped, much longer than the calyx-tube.

5. **A. oxyphylla,** *Wall. Cat.* 6193 (Hedyotis); glabrous, root perennial, stem stout erect, leaves petioled linear-lanceolate, stipules long lanceolate simple toothed or laciniate, cymes terminal subcorymbose many-flowered, peduncles and pedicels erect, calyx-teeth short broad, capsules pedicelled turgid hemispheric, cells 5–8-seeded. Oldenlandia oxyphylla, *G. Don Gen. Syst.* iii. 531.

KHASIA MTS.; in marshy places, alt. 2–5000 ft., common.

Stem 12–18 in., simple, rarely branched above, as thick as a goose-quill below, and rooting at the lower nodes. *Leaves* 4–6 by ¼–¾ in., tapering to the base, dark when dry; stipules ½ in., base ovate, not connate, coriaceous, erect. *Cymes* much divided with slender erect peduncles and pedicels. *Corolla* pale lilac, much longer than the calyx-teeth.—Specimens from Griffith's collection are marked as from Darjeeling, probably by mistake for Khasia.

6. **A. urophylla,** *Wall. Cat.* 6197 (Hedyotis); glabrous, root perennial, stem erect simple, leaves sessile lanceolate caudate-acuminate, stipules cut into many bristles, cymes terminal many-flowered, peduncles and pedicels divaricate in fruit, calyx-teeth short broad, capsules shortly pedicelled turgid hemispheric, cells 5–8-seeded.

KHASIA and JYNTEA Mts., alt. 4–6000 ft., *Gomez*, *Griffith*, &c.

Resembles *A. oxyphylla* in habit, but is more slender, with shorter broader sessile

leaves, shorter stipules cut to near the base into bristles, and more spreading shorter cymes with divaricating capsules.

7. **A. lancifolia,** *Dalz. in Hook. Kew Journ.* ii. 135 (Hedyotis); perennial?, erect, branched, leaves short-petioled ovate or ovate-lanceolate acuminate pubescent, stipules with short bristles, cymes terminal and subterminal many-flowered corymbose glabrate or hispid, capsules sessile subsolitary didymous hispid much broader than long, crown very prominent 2-lobed, cells 2–4-seeded. Hedyotis lancifolia, *Dalz. & Gibs. Bomb. Fl.* 116. H. tubularis, *Wall. Cat.* 876 A. (*a seedling state*).

MYSORE, *Rottler, Heyne.* THE CONCAN, *Nimmo, Dalzell, &c.*

Stem stout, shining, 2–3 ft., brittle, most diffusely branched. *Leaves* 1–2½ in., membranous; stipules short. *Cymes* often 4–6 in. diam., with slender di-trichotomous divaricating branches. *Calyx-teeth* subulate, many times shorter than the slender cylindric corolla-tube. *Capsules* always hispid with recurved calyx-teeth, sometimes ¼ in. across the long axis.

** Annuals.

† *Capsules pedicelled or sessile, solitary or subsolitary, not collected into heads.*

8. **A. Rheedii,** *W. & A. Prodr.* 409 (Hedyotis); annual, very slender, nearly glabrous, branches suberect, leaves petioled ovate or ovate-lanceolate acuminate very membranous with minute scattered short hairs on both surfaces, stipules short crenate, cymes axillary and terminal very lax and open with long capillary peduncles and pedicels, capsules solitary or 2-nate short-pedicelled puberulous broadly didymous, crown much longer than the calyx-tube, cells 1–2-seeded, calyx-teeth very minute. Hedyotis latifolia, *Dalz. in Hook. Kew Journ.* ii. 133; *Dalz. & Gibs. Bomb. Fl.* 116. H. racemosa, *Wall. Cat.* 875, *in part.* H. capillipes, *Schlecht. in Herb. Hohen.* No. 847.—*Rheede Hort. Mal.* x. t. 25.

WESTERN PENINSULA; on the hills from the Concan southwards.

Stem 6 in.–2 ft., quite erect from the base. *Leaves* 2–3 in., narrowed into the slender petiole. *Cyme-peduncles* sometimes 3 in., branches 1–2 in. *Flowers* very minute. *Corolla* rose, tube short cylindric. *Capsules* $\frac{1}{10}$ in. diam., rather membranous, after bursting appearing as 4 connate cups; the calyx-tube in fruit very much smaller than in any other species, and the dehiscence proportionably low.

9. **A. calycina,** *Wall. Cat.* 878 (Hedyotis); annual, erect, slender, glabrous, leaves small ovate-lanceolate acuminate ciliolate, cymes axillary and terminal few-flowered, capsules sessile and pedicelled broader than long with very short calyx-teeth, cells 20–40-seeded, seeds peltate reticulate.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, alt. 3–7000 ft. KHASIA MTS., alt. 3–6000 ft. CHOTA NAGPORE, alt. 2–4000 ft.

Stems 4–8 in., simple or copiously branched from the base, shining, 4-angled. *Leaves* ¼–1 in., membranous with sometimes a few minute scattered hairs; stipules with short lateral bristles. *Cyme-peduncles* and branches capillary. *Corolla* short, pale purple. *Capsules* didymous, truncate, crown tumid often exceeding the minute distant calyx-teeth.

†† *Capsules in clusters or heads.*

10. **A. Montholoni,** *Hook. f.*; annual, erect, glabrate or hispid, diffusely branched, leaves petioled ovate or ovate-lanceolate acute, stipules with short bristles, cymes terminal and subterminal peduncled rounded many-flowered not capitate, calyx-teeth small subulate with short hair-points, capsules clustered didymous broader than long with a large double convex crown, cells 1–3-seeded.

WESTERN PENINSULA; on the Ghauts from Concan southwards, *De Montholon* (in Herb. Gay), *Ritchie, Dalzell*, &c.

This resembles a good deal a short annual state of *A. Leschenaultiana*, but the capsules are subsessile, collected in small clusters, and the crown so protruded in 2 hemispheric bosses that the calyx-teeth are nearer the pedicel than the top. *Corolla* funnel-shaped, purple. *Seeds* subglobose, pitted, and with a deep ventral pit.—The short hair-point of the calyx-teeth and bracts is a good character.

11. **A. quadrilocularis,** *Thw. Enum.* 144 (Hedyotis); annual, diffusely branched, branches slender glabrous, leaves petioled ovate subacute membranous slightly hairy on both surfaces, stipules truncate the upper with short bristles, cymes very small capitate peduncled and terminal or axillary and sessile, capsules sessile 2–4-lobed 2–4-celled with very small calyx-teeth. H. tubularis, *Br. in Wall. Cat.* 876 *b.*

MYSORE; on the Bababoodan hills, *Rottler*; Belgaum, *Ritchie.* TRAVANCORE; Courtallum, *Wight.* CEYLON; Badulla district, rare, *Thwaites.*

Much more slender than *A carnosa*, not at all fleshy, with membranous petioled leaves and much smaller calyx-teeth and longer corolla-tube. *Seeds* about 3 in each cell.

12. **A. carnosa,** *Dalz. in Hook. Kew Journ.* ii. 135 (Hedyotis); annual, diffusely branched from the base, glabrous, fleshy, leaves ovate- or oblong-lanceolate obtuse, margins recurved, stipules truncate or obsolete, cymes capitate sessile and axillary or peduncled and terminal, capsules sessile broader than long with large lanceolate calyx-teeth, cells 5-6-seeded. Hedyotis carnosa, *Dalz. & Gibs. Bomb. Fl.* 116.

CANARA; on the sea-shore at Malwan, *Dalzell*; Mangalore, *Hohenacker.*

Branches very numerous, rather stout, 5–6 in. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., pruinose. *Heads* 3 6-flowered, on strict peduncles $\frac{1}{4}$–1 in. *Calyx-teeth* as long as the very short funnel-shaped corolla-tube. *Capsules* $\frac{1}{8}$ in. diam., with a very wide tip and spreading calyx-teeth.

13. **A. fœtida,** *Dalz. in Hook. Kew Journ.* ii. 134 (Hedyotis); annual, erect, filiform, glabrous, leaves linear or narrowly linear-lanceolate subacute scaberulous above, margins recurved, stipules minute bristly, cymes of 2–3 subsessile flowers terminating simple or forked slender subterminal peduncles, capsules sessile broader than long didymous crown very prominent, cells 1–6-seeded. Hedyotis fœtida, *Dalz. & Gibs. Bomb. Fl.* 116. H. tenella and H. subtilis, *Miq. in Herb. Hohen.* No. 173. H. tenuiflora, *Schlecht.* ... No. 848.

The CONCAN and CANARA at Malwan, in stony ground, *Stocks, Dalzell*, &c.

A very slender annual, 4–6 in. high, simple or excessively branched, the branches erect. *Leaves* sessile, 1 by $\frac{1}{10}$–$\frac{1}{8}$ in. *Cymes* on capillary erect peduncles; flowers capitate. *Corolla* funnel-shaped. *Capsules* about $\frac{1}{6}$ in. diam.

14. **A. Ritchiei,** *Hook. f.*; annual, stem 6 in. high very slender acutely 4-angled hispid above, leaves shortly petioled small lanceolate or oblong-lanceolate acute or obtuse hispid on both surfaces, stipules inconspicuous rounded toothed, cymes terminal short few-flowered shortly peduncled hispid, flowers sessile, calyx-teeth lanceolate acuminate much shorter than the very slender corolla-tube.

CONCAN; Belgaum? *Ritchie.*

A very small slender species, growing in tufts apparently as if drawn up amongst grass, the internodes very long. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., flat. *Cymes* $\frac{1}{4}$–$\frac{1}{2}$ in., with few and short branches, hispid with white hairs, as is the unopened corolla; flowers 2 3-nate. *Corolla* purple, lobes short rough within. *Stamens* exserted; anthers linear. *Ovary* 2-celled; cells about 4-ovuled. *Fruit* unknown.

SECT. II. **Patzia.** *Fruit* compressed or flattened, tardily dehiscent or indehiscent.

* *Fruit much flattened, indehiscent or obscurely dehiscent in the crown.*

15. **A. nummularia,** *Arn. Pugill. Pl. Ind. Or.* 23 (Hedyotis); perennial, hairy, stems long stout ascending, leaves sessile orbicular or broadly ovate obtuse or apiculate glabrous or hairy, stipules of a few bristles or obsolete, cymes terminal long-peduncled simple or 3-chotomous, flowers capitate, fruit flat orbicular indehiscent, cells 1–2-seeded.

CEYLON; abundant in wet places; alt. 5–8000 ft.

Stem 8–18 in. from a creeping base, sparingly branched, nodes often distant. *Leaves* uniform throughout the stem, $\frac{1}{3}$–$\frac{2}{3}$ in. diam., coriaceous, usually with crisped hairs, especially beneath. *Cymes* on stout peduncles 1–4 in., each usually once 3-chotomously divided, branches terminating in a head of flowers $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; flowers sessile. *Calyx-teeth* short. *Fruit* with 2 ridges on each face, not at all didymous, contracted below the short calyx-teeth.

VAR. *glabra*, Thw. Enum. 142; quite glabrous, leaves ovate very coriaceous flat or with recurved margins. *H. nummulariformis, Arn. l. c.*—I reluctantly follow Thwaites in regarding this distinct-looking plant as a variety of *A. nummularia*.

16. **A. Wightiana,** *Wall. Cat.* 6194 (Hedyotis); perennial, tomentose, diffuse, leaves sessile or subsessile ovate subacute, stipules short deeply toothed, cymes small terminal and on short axillary branches sessile capitate few-flowered involucrate, fruit orbicular compressed indehiscent 2–4-celled, cells 1–2-seeded. Hedyotis Wightiana and H. Finlaysoniana, *Wall. Cat.* 6194, 6189. Oldenlandia Teysmaniana, *Miq. Fl. Ind. Bat.* ii. 354. Spermacoce compressa, *Wall. Cat.* 6187.

TEMPERATE HIMALAYA, alt. 4–8000 ft., from Nepal to Bhotan. KHASIA MTS., alt. 4–5000 ft. Mountains of the WESTERN PENINSULA, alt. 5–7000 ft.—DISTRIB. Ava, Malay Islands, Cochin China.

Stems 2–18 in., leaves clothed with soft curly spreading hairs. *Leaves* $\frac{1}{2}$–1 in., variable in breadth. *Heads* involucrate by 2 leaves. *Flowers* white blue or purplish, shortly pedicelled. *Fruit* very small, contracted towards the short calyx-teeth, grooved at the union of the carpels, rugose when dry.—The Western Peninsula specimens are much shorter than the Northern or Eastern. Clarke has observed that the flowers are white in the 2-carpellary, light blue in the 3-carpellary, and blue in the 4-carpellary specimens.

** *Fruit compressed, finally septicidally dehiscent.*

17. **A. monosperma,** *W. & A. Prodr.* 410 (Hedyotis); perennial, slender, diffuse, more or less hairy, leaves petioled small ovate subacute, stipules with short lateral bristles, cymes small short terminal peduncled sparingly unequally forked few-flowered bracteate, capsules shortly pedicelled subglobose, cells 1–2-seeded. H. monosperma, *Wight Ic.* t. 1031. H. mysurensis, *Wall. Cat.* 882. Oldenlandia mysurensis, *G. Don Gen. Syst.* iii. 531.

NILGHERRY and PULNEY MTS., *Heyne, Wight*, &c.

A small-leaved much branched delicate species, more or less clothed with crisped hairs. *Leaves* $\frac{1}{3}$–1 in., petiole often half their length. *Cymes* including the peduncles rarely $\frac{1}{2}$ in. long; flowers minute. *Corolla-tube* broadly funnel-shaped, about twice the length of the subulate calyx-lobes. *Capsules* $\frac{1}{10}$ in. diam., with recurved calyx-teeth, didymous; cells usually 1-seeded. *Seeds* ellipsoid, deeply pitted.

18. **A. Richardiana,** *Arn. Pugill. Pl. Ind. Or.* 22 (Hedyotis); perennial, diffuse, slender, glabrous, or more or less hairy or villous, leaves petioled ovate acute, stipules with long hairy bristles, cymes terminal and subterminal on

slender peduncles unequally forked few-flowered bracteate, capsules subsessile turbinate with the crown very convex, cells 1-seeded. Hedyotis monosperma, *var.* subglabra, *Thw. Enum.* 142.

CEYLON; Neuera Ellia, abundant in the more elevated districts.

Very near *H. monosperma*, with which Thwaites unites it, but the stipules are much longer, as are the cymes, and the fruit is very different, twice as large and more elongate with a tumid crown, and larger ellipsoid seeds.—Very fœtid (Thwaites).

23. **SPIRADICLIS,** *Blume.*

Annual herbs or undershrubs. *Leaves* opposite and falsely whorled, narrowed into a slender petiole; stipules long, subulate, persistent. *Flowers* minute, white or yellow, shortly pedicelled along one side of the branches of a dichotomous axillary or terminal spicate or paniculate cyme. *Calyx-tube* ovoid or cylindric, ribbed; lobes 5, small, obtuse, persistent. *Corolla* funnel-shaped, tube long or short; lobes 5, short, obtuse, valvate in bud. *Stamens* 5, in the corolla-tube, filaments short; anthers oblong. *Ovary* 2-celled; style filiform, glabrous or hairy, stigma 2-lobed; ovules numerous, on placentas attached to the middle of the septum. *Capsules* small, subglobose or linear-oblong, loculicidally 2-valved, many-seeded. *Seeds* minute, angled, testa reticulate; embryo microscopic in fleshy albumen.—DISTRIB. Species 3, Asiatic.

1. **S. cæspitosa,** *Blume Bijd.* 975; stem creeping below, leaves small elliptic obtuse, spike shortly peduncled unilateral few-fld., capsules linear-oblong. *Kurz in Journ. As. Soc.* 1877, ii. 129, *excl. syn.*

MARTABAN rare, *Kurz.*—DISTRIB. Java.

Whole plant a span long; stem ascending from a rooting base. *Leaves* 1–1½ in., in few pairs, elliptic, glabrous or faintly puberulous beneath. *Spikes* ½–¾ in.—I have seen no Martaban specimens, but have Javan from Kurz, who consequently knew the species.

2. **S. cylindrica,** *Wall. Cat.* 6215 (Pleotheca); erect, leaves elliptic or elliptic-lanceolate caudate-acuminate, cymes simply dichotomous, capsules linear-oblong.

KHASIA MTS., alt. 2–4000 ft., *De Silva*, &c. MISHMI HILLS, *Griffith.*

Stem 6–18 in., simple or branched. *Leaves* 2–6 by ½–2½ in., glabrous or puberulous beneath, upper often fascicled as if whorled. *Cymes* 1–6 in. long, on slender peduncles, branches long or short; flowers close or distant; bracteoles minute or 0. *Capsules* $\frac{11}{10}$ in. long, clavate in dehiscence.

3. **S. bifida,** *Wall. Cat.* 6216 (Pleotheca?); erect, leaves elliptic or elliptic-lanceolate caudate or acuminate, cymes in slender panicles, capsules subglobose. *Kurz in Journ. As. Soc. Beng.* 1872, ii. 311.

KHASIA MTS., alt. 2–4000 ft., *De Silva*, &c. UPPER ASSAM, *Griffith.* CACHAR, *Keenan.*

Stem slender or robust, 1-several feet high, puberulous. *Leaves* 6–12 by 1½–4 in., shining above, puberulous on the midrib above and nerves beneath. *Panicles* 4–10 in., many-flowered; branches short, spreading.

24. **POLYURA,** *Hook. f.*

A low herb with rooting stem. *Leaves* opposite or falsely whorled; stipules filiform or subulate. *Flowers* shortly pedicelled, crowded along one side of the short alternating recurved branches of a terminal panicle; bracts leafy, imbricate. *Calyx-lobes* 5, persistent. *Corolla* funnel-shaped, tube short; throat densely

bearded; lobes 5, short, obtuse, valvate in bud. *Stamens* 5, in the middle of the tube, filaments subulate; anthers shortly 2-fid at both ends. *Ovary* 2-celled; style filiform, puberulous, stigmas 2 obtuse; ovules numerous, on subglobose placentas inserted on the middle of the septum. *Capsule* small, subglobose, septicidal, 2-celled, many-seeded. *Seeds* obtusely angled, testa crustaceous; embryo minute in fleshy albumen.

1. **P. geminata,** *Hook. f. in Ic. Pl.* t. 1049. Ophiorhiza ? geminata, *Wall. Cat.* 6237.

KHASIA MTS., alt. 2–4000 ft., *Hamilton, Gomez*, &c. MISHMI HILLS, *Griffith.*

Whole plant 4–10 in. high, simple or branched from the base, pubescent. *Leaves* 2–4 in., elliptic-oblong or -lanceolate, obtuse or obtusely acuminate; petiole long or short, often winged; nerves many, very spreading, often red-brown when dry; stipules filiform.

25. OPHIORRHIZA, *L.*

Erect creeping or decumbent small herbs, rarely undershrubs. *Leaves* usually elliptic-lanceolate; stipules caducous. *Flowers* white pink or greenish, secund on the branches of axillary or terminal dichotomous cymes; bracts or bracteoles various or 0. *Calyx-tube* short; lobes 5, small, persistent. *Corolla* tubular or funnel-shaped; lobes 5, short, valvate in bud, back often winged, often also with a fold in the sinus. *Stamens* 5, inserted on the tube; anthers linear. *Disk* very large, 2-lobed. *Ovary* 2-celled; style filiform, stigmas broad or linear; ovules many, inserted on basal ascending placentas. *Capsules* coriaceous, compressed, obcordate, girt in the middle by the calyx-tube, the crown dehiscing by 2 broad gaping valves; placentas divaricating, many-seeded. *Seeds* minute, angled, testa crustaceous; embryo clavate, in fleshy albumen.—DISTRIB. Species about 50, tropical Asiatic, with a few Australian and Polynesian.

A very difficult genus; the characters taken from the position of the stamens on the corolla-tube, the hairiness within of the latter, the length and smoothness or hairiness of the style, and the form of the stigma, have not been made diagnostic, as being probably sexual to a very great degree.

* *Bracteoles* 0, *or if present very narrow and caducous, falling away before the capsules are fully formed. Corolla usually under* ½ *in. long* (*except in* O. Wallichii). *The species of this group are very closely allied indeed and difficult of definition.*

1. **O. Mungos,** *Linn.*; erect, glabrous, or stem petioles cymes and leaf nerves beneath puberulous, stipules small, cyme-branches subumbellate very spreading, bracts 0, calyx-teeth very short, corolla glabrous rounded at the tip in bud ¼ in., mouth not dilated, lobes very short obtuse keeled at the back. *Gaertn. Fruct.* i. t. 55; *Roxb. Fl. Ind.* i. 701; *W. & A. Prodr.* 404.

KHASIA MTS. and ASSAM, ascending to 2000 ft. BIRMA, TENASSERIM, ANDAMAN and NICOBAR ISLANDS. Mts. of the WESTERN PENINSULA and CEYLON.—DISTRIB. Sumatra, Java.

A suffrutescent herb. *Leaves* 2–5 by 1–2½ in., very thin, elliptic or elliptic-lanceolate, long-acuminate, narrowed into the petiole. *Cymes* 1–3 in. diam., flat-topped, glabrous or pubescent. *Corolla* white. *Capsules* ⅙–⅓ in. diam., pedicelled.—The following varieties may be referable to *O. Harrisiana.*

VAR. *nemorosa*, Thw. Enum. 139 (sp.); leaves elliptic or obovate-lanceolate, stipules rounded with 1–2 long points, cymes fewer-flowered tomentose or glabrate.—Ceylon.

VAR. *angustifolia*, Thw. Enum. 140 (sp.); leaves narrower, calyx-teeth longer, corolla-tube shorter.—Ceylon.

2. **O. Harrisiana,** *Heyne in W. & A. Prodr.* 405; herbaceous or shrubby below, stem above leaf-nerves beneath and cymes pubescent or tomentose, leaves ovate or ovate- or elliptic-lanceolate obtuse acute or acuminate glabrous or with minute scattered hairs above, stipules with 1 or more long points, cymes tomentose or glabrate rather contracted, bracteoles few filiform caducous or 0, calyx-teeth subulate, corolla glabrous or pubescent ¼–⅓ in. tubular, lobes short keeled on the back, capsule glabrous.

Hilly districts of India from NIPAL eastward to the KHASIA MTS., alt. 0–5000 ft. ASSAM, SILHET, CHITTAGONG, TENASSERIM, *Helfer* (Kew Distrib. 2857), *Griffith* (Kew Distrib. 2857–8–9); EASTERN PENINSULA, from the Concan southwards; CEYLON.

A common and variable plant, probably a variety of *O. Mungos*, but smaller, more pubescent, with longer stipules, usually longer subulate calyx-teeth, and setaceous or filiform bracteoles, less spreading cymes, and smaller capsules. The following seem referable to it, and are scarcely distinguishable.

VAR. 1. *Harrisiana*, Wall. Cat. 6236; slender, rooting below, leaves 1½–2 in. broadly ovate often obtuse base often rounded or even subcordate glabrous above, cymes small. *Wight Ic.* t. 1162 (*Harrisonii*). - Mysore, *Heyne*, &c.

VAR. 2. *rugosa*, Wall. Cat. 6235 (sp.); slender, leaves 1–2½ in. ovate-lanceolate acuminate at both ends with minute scattered hairs above, cymes few-fld.—O. prostrata, *Don Prodr.* 136.—Sikkim and Nipal.

VAR. 3. *decumbens*, Gardn. Mss.; stems decumbent often much branched, leaves 1½–4 in. obtuse or acute narrowed at the base glabrous above, cymes contracted, corolla very short.—Ceylon, alt. 5–6000 ft.; abundant in the Eastern Peninsula and Tenasserim.

VAR. 4. *argentea*, Wall. Cat. 6229 (sp.); more glabrous, leaves 1½–4 in. ovate or narrowly lanceolate usually white beneath and sometimes along the midrib above glabrous or with short hairs above, cyme and flowers glabrous.—Khasia Mts., Sylhet, Chittagong, Mergui, Ceylon, Nilgherries, and other Peninsula Mts.

VAR. 5. *merguensis*; like var. *argentea*, but cyme and corolla very tomentose, leaves either glabrous or with scattered short hairs above.—Mergui, Nilgherries.

3. **O. trichocarpa,** *Bl. Bijd.* 977; stem erect branched, leaf-nerves beneath and cyme densely pubescent, leaves ovate acute or acuminate glabrous or with scattered hairs above, stipules filiform from a subulate base, cymes small sessile or shortly peduncled dense-flowered tomentose, bracteoles 0, calyx-teeth subulate, corolla ¼ in. puberulous, tube narrow, capsules pubescent. O. hispidula, *Wall. Cat.* 6234; *G. Don Gen. Syst.* iii. 523. O. villosa, *Kurz in Journ. As. Soc.* 1877, ii. 130, *excl. synon.*

CHITTAGONG, *Lister*. TENASSERIM, and the ANDAMAN ISLANDS, *Gomez*, *Griffith* (Kew Distrib. 2869).—DISTRIB. Java.

This may be only a form of *Harrisiana*, and if so this latter name must give place to Blume's. I see little but the pubescent capsules whereby it is to be distinguished.

4. **O. ochroleuca,** *Hook. f.*; shrubby, glabrous except the cymes, leaves large quite glabrous beneath, stipules lanceolate 2-fld. caducous, cyme-branches spreading, bracts 0 or minute and caducous, calyx-teeth very short, corolla cylindric fleshy mouth not dilated, lobes short recurved pubescent within with a short dorsal spur below the top not keeled at the back, capsule glabrous. Ophiorrhiza, 5 *Herb. Ind. Or. H. f. & T.*

SIKKIM and BHOTAN HIMALAYA, alt. 1–5000 ft., common. KHASIA MTS., alt. 0–4000 ft. CACHAR, *Keenan*.

A small shrub. *Leaves* 4–9 by 1½–3 in., elliptic or elliptic-lanceolate, caudate-acuminate, nerves 10–15 pair; petiole long. *Cyme-peduncles* and branches very stout, more irregularly branched than in *O. Mungos*. *Corolla* ⅓–½ in., primrose-yellow orange or greenish. *Capsules* pedicelled, ⅓ in. diam.

5. **O. rosea,** *Hook. f.*; shrubby, glabrous except the cymes, leaves glabrous or with the nerves beneath puberulous, stipules minute 2-fld. caducous,

bracts minute or 0, calyx-teeth very short, corolla (rounded at the tip in bud) glabrous or puberulous cylindric glabrous within mouth not dilated, lobes short rounded recurved not keeled or spurred at the back. O. discolor, *Wall. Cat.* 6232 B. Ophiorrhiza, 6 *Herb. Ind. Or. H. f. & T.*

EASTERN HIMALAYA from Sikkim to Mishmi, and KHASIA MTS, alt. 4–7000 ft., common.

Very similar to *O. ochroleuca*, but inhabiting a higher level and differing in the corolla, which is $\frac{1}{3}$–$\frac{1}{2}$ in. long, rose, not fleshy, and very different in bud.

6. **O. Wallichii,** *Hook, f.*; quite glabrous or the cymes puberulous, leaves elliptic-lanceolate caudate-acuminate rather coriaceous, petiole slender, cymes short-peduncled few-flowered, branches very short, bracteoles subulate, calyx-teeth very short subulate, corolla 1 in., tube slender terete, lobes short broad tomentose within. Psychotria sp., *Wall. Cat.* 8358.

KHASIA MTS., *De Silva*; JYNTEA HILLS, *Gomez*; BIRMA, *Griffith* (Kew Distrib. 2683).

Stem branched, rather thickened at the nodes. *Leaves* 4–6 in., stiff, pale reddish beneath when dry; stipules not seen. *Cyme-peduncle* $\frac{3}{4}$ in., slender; flowers crowded. *Fruit* unknown.—A very distinct species, easily distinguished by the long stiff leaves, reddish beneath, and the long corolla with short lobes.

7. **O. discolor,** *Br. in Wall. Cat.* 6232 A.; tall, branched, quite glabrous, leaves elliptic-lanceolate long-acuminate membranous red beneath when dry, petiole very slender, stipules long slender, cymes puberulous, branches spreading, bracteoles 0, corolla $\frac{1}{4}$ in., tube cylindric smooth, lobes not keeled, capsules glabrous. *G. Don Gen. Syst.* iii. 522.

PENANG, *Wallich.*

Apparently a tall slender shrub. *Leaves* 5–8 in., gradually narrowed at both ends, membranous, nerves slender. *Cymes* as in *O. Mungos.*

8. **O. villosa,** *Roxb. Fl. Ind.* i. 702; stem stout shrubby and leaf-nerves below and cymes densely tomentose, leaves ovate or ovate-lanceolate acute or acuminate rather coriaceous glabrous above white beneath, cymes dense subcapitate, branches very short, bracteoles 0, calyx-teeth short, corolla $\frac{1}{4}$ in. puberulous, tube angular. *Wall. Cat.* 6230.

CHITTAGONG HILLS, *Roxburgh.*

This differs from all the forms of *Harrisiana*, var. *argentea* (also a Chittagong plant), in the robust habit, coriaceous leaves, and almost capitate cyme densely clothed with a rusty-red pubescence. The buds are truncate with 5 points, and the short corolla lobes strongly keeled.—Roxburgh's drawing (in Bibl. Kew) of this plant is quite unlike the specimens in Wallich's Herbarium, which agree with the description in the Flora Indica.

9. **O. tomentosa,** *Jack in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 546; erect, softly pubescent throughout, leaves elliptic-lanceolate acuminate white beneath, stipules subulate, cymes with spreading branches, bracteoles 0, calyx-teeth small, corolla $\frac{1}{4}$ in. pubescent, lobes not keeled, capsule glabrate or puberulous. *Wall. Cat.* 6231.

PENANG, *Wallich*, *Phillips*, *Maingay* (Kew Distrib. 898).—DISTRIB. Sumatra.

Stem 1–2 ft., stout. *Leaves* 3–5 in., petiole slender, both surfaces powdery. *Flowers* small.

VAR. ? *glabrata*; leaves larger broader less pubescent, cyme glabrate.—Malacca? *Maingay* (Kew Distrib. 899).

10. **O. Brunonis,** *W. & A. Prodr.* 404; shrubby, branched, quite glabrous except the puberulous cymes, leaves ovate or ovate- or elliptic-lanceo-

late acute, stipules subulate, cymes subcorymbose many-flowered rounded, bracteoles long linear or filiform deciduous, calyx-teeth subulate, corolla glabrous tip 5-angled in bud, capsules glabrous.

NILGHERRY MTS., *Wight*, &c. COCHIN, *Johnson.*

The rounded cymes, and numerous long subpersistent bracteoles, are good characters for the species. *Leaves* 3–4 in., usually ovate or ovate-lanceolate, base acute, very membranous; petiole slender. *Cyme-peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in., longer in fruit. *Corolla* $\frac{1}{3}$ in. long, cylindric, lobes narrow. *Capsules* crowded, $\frac{1}{4}$ in. diam.

VAR. ? *Johnsoni*; corolla narrower and longer $\frac{2}{3}$ in. puberulous.—Cochin, *Johnson.*

VAR. ? *hirsutior*, Wight mss.; branches petioles and cymes densely tomentose.—Nilgherry Mts., *Gardner.*—I have seen neither flower nor fruit of this.

11. **O. gracilis,** *Kurz in Journ. As. Soc.* 1872, ii. 311; annual, erect, perfectly glabrous, leaves lanceolate with very long slender points, cyme long-peduncled, branches slender, bracteoles subulate, calyx-teeth minute, corolla-tube $\frac{1}{4}$ in. terete glabrous.

TENASSERIM, *Kurz*; BIRMA, *Brandis.*

I have seen a single specimen only. It is at once distinguished by the very long slender points of the membranous leaves, which are 5–9 in. long and rather oblique.

12. **O. radicans,** *Gardn. in Thw. Enum.* 139; stems densely tufted slender creeping, leaves small ovate-cordate or orbicular obtuse glabrous above nerves beneath petioles and cymes pubescent, stipules minute subulate, cymes small few-flowered contracted, bracteoles few subulate, calyx-teeth subulate, corolla small, lobes short keeled on the back.

CEYLON; Central Province, *Gardner, Thwaites.*

Stems flexuous, a foot long, rooting at every node. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Cyme-peduncles* usually shorter than the leaves, but sometimes longer. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. long. *Fruit* not seen.

13. **O. oppositiflora,** *Hook. f.*; stem erect woody and petioles leaf-nerves beneath and peduncle appressedly rusty-pubescent, leaves ovate-lanceolate acute glabrous rather rigid, stipules subulate, cymes terminal and opposite in the leaf-axils corymbose many-flowered, bracteoles minute or 0, calyx-teeth lanceolate obtuse, corolla $\frac{1}{3}$ in. glabrous within and without tubular 5-angled, lobes oblong obtuse keeled.

KHASIA MTS. (tropical ?), *C. B. Clarke.*

Stem rigid, scabrid, 1–2 ft. *Leaves* 2–3 in.; petiole slender. *Cymes* often in the axils of all the 3–5 upper pairs of leaves, $\frac{3}{4}$–1 in. diam.; peduncles slender, $\frac{1}{2}$–1 in.; branches erect; flowers numerous, slender, erect.—A very remarkable species, the only one with opposite cymes.

** *Bracteoles very slender, persistent or subpersistent. Corolla an inch or more long, pubescent or hairy, lobes broad acute.*

14. **O. grandiflora,** *Wight Ic.* t. 1069; erect, glabrous except the hairy corolla, leaves elliptic-lanceolate acuminate, stipules minute lanceolate, cymes contracted, bracteoles very long filiform, calyx-tube ribbed teeth lanceolate, corolla 1–1$\frac{1}{4}$ in. hairy, tube slender funnel-shaped above glabrous within, lobes large broadly ovate acute, capsules glabrous.

THE CARNATIC; Shevagherry hills, *Wight.*

An erect undershrub. *Leaves* 5–7 in., membranous, almost caudate-acuminate. *Cymes* 1–1$\frac{1}{2}$ in. diam.; peduncles short, $\frac{1}{2}$–1 in.; branches suberect; bracts and bracteoles $\frac{1}{2}$–1 in. *Calyx-teeth* equalling the tube. *Corolla* $\frac{3}{4}$ in. across the lobes. I have seen no fruit.

15. **O. Roxburghiana,** *Wight Ic.* t. 1068; erect, branches leaf-nerves beneath and cymes densely pubescent, leaves elliptic-lanceolate acuminate glabrous, stipules large ovate or ovate-oblong entire or 2-fid, cymes contracted, bracteoles many linear-subulate, calyx-tube terete, lobes lanceolate, corolla 1–1½ in. pubescent, tube slender funnel-shaped above hairy within, lobes large broadly ovate acute, capsule hairy.

THE CARNATIC; Shevagherry or Pulney hills, *Wight.*
Similar in habit, stature, foliage and flowers to *O. grandiflora*, but the cyme is longer peduncled densely pubescent, the calyx-tube terete, bracteoles much shorter, and capsules hairy.—Wight in his Icones states that this is a native of the Shevagherry hills, but the ticket on his specimen says Pulney Mts., Sept. 1836.

16. **O. eriantha,** *Wight Ic.* t. 1067; erect, branches and petioles pubescent or villous, leaves elliptic-lanceolate acuminate glabrous above puberulous on the nerves beneath, stipules subulate-lanceolate equalling the petioles, cymes villous with long soft hairs contracted, bracteoles filiform caducous, calyx-tube terete, lobes subulate, corolla 1 in. villous with long soft hairs, tube slender funnel-shaped above lobes large broadly ovate acute, capsules hairy.

THE CARNATIC; Shevagherry or Travancore hills, *Wight.*
This resembles both *O. grandiflora* and *Roxburghiana*, differing from the former in the stipules, terete calyx, and hairy capsules, and from both in the villous cyme.—This again is stated by Wight in the Icones to be a native of the Shevagherry hills, but his specimens bear 2 tickets of Courtallam, one of July, the other of August, 1835.

17. **O. hirsutula,** *Wight mss.*; erect; stem petioles and cymes softly rusty-tomentose, leaves ovate-lanceolate acuminate sparsely hairy above furfuraceous beneath, stipules subulate-lanceolate, cymes axillary subcorymbose, peduncles stout, bracteoles very narrow subpersistent, calyx-teeth lanceolate obtuse hispid, corolla hirsute, tube cylindric.

NILGHERRY MTS.; Sisparah, *Wight.*
Apparently shrubby. *Leaves* 4–6 in., scabrid above when dry, pale and reddish beneath; petiole short. *Cyme* 1 in. diam.; peduncle 2 in.; branches spreading; bracteoles scattered, pubescent; flowers few and scattered. *Flowers* seen in bud only. *Capsule* pubescent.

*** Bracteoles linear or oblong, with a distinct midrib, persistent in fruit. Corolla less than an inch long (except in *O. calcarata*).

† *Bracteoles quite glabrous.*

18. **O. pectinata,** *Arn. Pugill. Pl. Ind. Or.* 20; erect, glabrous, leaves elliptic-lanceolate long-acuminate, stipules subulate from a broad base, cymes capitate many-flowered, peduncle strict axillary or terminal, bracteoles many lanceolate glabrous, calyx-teeth subulate, corolla ½ in., tube cylindric, lobes short keeled villous within. *Thw. Enum.* 140. O. imbricata, *Gardn. mss.* O. Mungos, *Wall. Cat.* 6227 D. Psychotria, *Wall. Cat.* 8356.

WESTERN PENINSULA; Shevagherry hills, Malabar and Quilon, *Wight.* CEYLON; abundant up to 5000 ft., *Walker*, &c.
Stem a foot high, stout, rarely branched, sometimes puberulous upwards. *Leaves* 4–7 in., variable in breadth, pale beneath, midrib very stout. *Cymes* globose, ⅓–1½ in. diam.; peduncle 1–4 in., glabrous or pubescent, stout or slender; flowers usually densely compacted, rarely loose and pedicelled; bracteoles ¼ in., green, imbricate. *Capsules* ⅓ in. diam., glabrous or puberulous.

19. **O. pallida,** *Thw. Enum.* 140; procumbent, creeping below, stem and petioles subtomentose, leaves small elliptic-ovate subacute or acuminate with

short curly hairs on both surfaces, stipules setaceous, cymes contracted long-peduncled glabrous, bracteoles numerous persistent linear glabrous, calyx-tube ribbed, teeth lanceolate obtuse, corolla ¼ in., lobes very short broadly winged.

CEYLON; forests of the Ambagamowa district, *Thwaites*.

A small species, of lax habit, more or less clothed everywhere, except the glabrous cyme, with short curly hairs. *Leaves* 1–4 in. *Cymes* smaller and more lax than in *O. pectinata*.—A small, quite creeping form has leaves very broad, not 1 in. long.

20. **O. succirubra,** *King mss.*; erect, nearly glabrous throughout, cymes and leaves beneath red-purple when dry, leaves elliptic-lanceolate acuminate, stipules lanceolate 2-fid, cymes short-peduncled contracted branches glabrous or pubescent above, bracteoles large linear-lanceolate persistent glabrous, calyx-tube broadly trapezoid, teeth triangular obtuse, corolla ⅓ in. glabrous within, lobes short keeled, capsules puberulous. Ophiorrhiza 17, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; in wet forests, alt. 5–8000 ft., *J. D. H., Dr. Treutler.*

Stem branched, glabrous, or with a line of hairs which runs up the peduncle, and stout short cyme-branches. *Leaves* 4–7 in., quite glabrous beneath, with sometimes a few scattered short hairs above. *Cymes* 1 in. diam., flat-topped, few-flowered, drooping, then erect; branches suberect; bracts veined, exceeding the glabrous capsules. *Calyx* puberulous, tube much broader than the pink corolla. *Disk-lobes* very large.—Dr. King has attached the mss. name of *succirubra* to this, no doubt from the colouring of the dried leaf resembling that of *Cinchona succirubra.*

21. **O. Griffithii,** *Hook. f.*; erect, glabrous, branches fleshy, leaves long-petioled elliptic acute, upper stipules large coriaceous oblong acute lower lanceolate, cymes contracted, bracteoles large linear-lanceolate glabrous, calyx-tube ribbed, teeth triangular, corolla-tube ¾ in. 5-angled villous within, lobes short broadly winged. Ophiorrhiza, *Griff. Ic. Pl. Asiat.* t. 475.

At Kuttack boom in the NAGA HILLS (Assam), *Griffith.*

A very fine species, of which I have seen no capsules. *Leaves* 3–5 in., elliptic and acute at both ends; petiole long, 1½–2 in.; upper stipules ½ in. and upwards. *Cymes* nodding on a stout short peduncle; flowers amongst the largest of the genus, crowded, purple, fleshy.—The leaves in Griffith's drawing have short thick petioles, but very slender ones in his 2 specimens.

22. **O. Thomsoni,** *Hook. f.*; slender, glabrous, stem puberulous creeping below, leaves ovate or elliptic-ovate subacute glabrous above nerves puberulous beneath, stipules filiform from a broad base, cymes small glabrous on slender axillary and terminal peduncles, bracteoles narrow persistent glabrous, calyx-teeth subulate, corolla-limb very broadly funnel-shaped, lobes broadly ovate acute. O. rugosa, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA., alt. 4–6000 ft., *Herb. Griffith, J. D. H. & T. T.*, &c.; BHOTAN, alt. 4000 ft., *C. B. Clarke.*

Stem 6–8 in., rooting below. *Leaves* 2–5 in.; petiole rather short. *Cymes* small, ½–¾ in. diam., branches spreading. *Corolla* ⅓ in., tube short, soon expanding into the very broad funnel-shaped limb. *Stamens* at the base of the tube. *Capsules* glabrous, ⅛ in. diam.

23. **O. lurida,** *Hook. f.*; stem 0 or short rooting at the base ascending and petioles and leaf-nerves beneath pubescent, leaves elliptic-oblong obtuse glabrous above, stipules filiform from a triangular base, cymes long-peduncled contracted glabrous, bracteoles linear glabrous persistent, calyx-teeth subulate, corolla ¼ in., limb funnel-shaped. Ophiorrhiza No. 12, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 3-4000 ft., *Herb. Griffith* (Kew Distrib. 2852), *J. D. H. & T. T.*, *C. B. Clarke.*

A small species, with a short copiously rooting stem. *Leaves* ½–3 in., rather long-petioled, lurid green both when fresh and dry. *Cymes* ½–1 in.; peduncle slender, long or short. *Corolla* ⅓ in. white, like that of *O. Thomsoni*, but having a short tube soon expanding into a funnel-shaped limb, with (I think winged) ovate lobes. *Capsules* glabrous.

24. **O. Treutleri,** *Hook. f.*; herbaceous, pubescent throughout with crisped hairs, stems stout fleshy erect, leaves elliptic-ovate or lanceolate subcaudate-acuminate, stipules lanceolate entire or 2-fid, cymes many-flowered on short peduncles hirsute, bracteoles long linear hispid persistent, calyx-teeth subulate, corolla hirsute, limb funnel-shaped with short spreading broad lobes glabrous within, capsules pubescent. Ophiorrhiza No. 16, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 5–7000 ft., *Herb. Griffith* (Kew Distrib. 2854), *J. D. H. & T. T.*, *Treutler.* KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*, *C. B. Clarke.*

A low stout species, 6–10 in., with very persistent large stipules. *Leaves* 2–4 in., sometimes almost glabrous above. *Cyme-branches* stout, ascending; bracteoles ½ in. or less, slender, 1-nerved. *Corolla* pink in Sikkim, white in Khasia.

25. **O. fasciculata,** *Don Prodr.* 136; erect, stem woody below pubescent above as are the petioles leaf-nerves beneath and cymes, leaves elliptic-ovate or lanceolate glabrous, stipules lanceolate long-acuminate, cymes spreading, bracteoles many lanceolate pubescent persistent, calyx-tube orbicular compressed, teeth very short, corolla pubescent, tube slender, lobes small, capsules pubescent. O. bracteolata, *Br. in Wall. Cat.* 6228. O. villosa, *Wall. Cat.* 6230 B.

SUBTROPICAL HIMALAYA; from Gurwhal, alt. 4000 ft., to Sikkim and Bhotan, alt. 4–7000 ft. KHASIA MTS., alt. 3–5000 ft.

Stem 6–18 in., simple or branched from the woody base. *Leaves* 1½–5 in., membranous; petiole slender. *Cymes* 1–2 in. diam., axillary and terminal, few or many-fid; bracteoles ¼ in. *Corolla* pure white, ½–¾ in., tube much more slender than in the allied species, throat very short, lobes oblong.

26. **O. hispida,** *Hook. f.*; stem above petioles and capitate cyme hispid, leaves elliptic-lanceolate long-acuminate glabrate or with scattered hairs above, nerves hispid beneath, stipules large oblong-lanceolate, cymes shortly peduncled dense-flowered subglobose clothed with linear ciliate bracteoles, calyx-teeth subulate, corolla ¼ in., tube slender, lobes oblong hispid with long hairs, capsules hispid. Ophiorrhiza No. 20, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* CACHAR; at Shapore, *Keenan.*

Stem woody below, ascending, 8–12 in.; hairs white, stiff, suberect and spreading. *Leaves* 3–6 in. *Cymes* ½–¾ in. diam.; peduncle hispidly hairy; branches very stout; bracteoles linear, ciliate; flowers greenish-white. *Corolla-tube* dilated below, narrowing upwards to the spreading lobes.

27. **O. subcapitata,** *Wall. Cat.* 6238; softly hairy, stem slender creeping below, leaves elliptic-lanceolate acuminate, stipules ovate acuminate, cymes small subcapitate on slender peduncles, bracts large lanceolate obtuse ciliate concealing the flowers, calyx-tube ribbed teeth membranous ovate-lanceolate ciliate, corolla-tube cylindric, lobes short hispid at the back glabrous within, capsules glabrous.

KHASIA MTS., alt. 3-4000 ft., *Gomez*, &c.

Stem long, slender, creeping below, ascending. *Leaves* 2–6 in., softly hairy, especially beneath. *Cymes* ⅓–⅔ in. diam.; bracteoles pinkish when dry; flowers very small, pedicelled. *Ovary* globose. *Corolla* glabrous, except the bristly back of the lobes.

28. **O. calcarata,** *Hook. f.*; stem slender creeping below and petioles leaf-nerves beneath and cymes softly pubescent, leaves elliptic-lanceolate acuminate glabrous above, stipules lanceolate entire or 2-fid, cymes contracted, bracteoles linear pubescent, calyx-teeth lanceolate, corolla $\frac{3}{4}$–1 in. hairy tubular, lobes very short each with a long spur at the back. Mussænda repens, *Wall. Cat.* 6263. Ophiorrhiza No. 19, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS, alt. 4–5000 ft., *Gomez, Griffith*, &c. (Kew Distrib. 2783.) MISHMI HILLS, alt. 4000 ft., *Griffith.*

Stem 10–18 in., flexuous. *Leaves* 2–4 in., lurid green above, pale beneath. *Cymes* 8–20 flowered; branches short ascending; bracteoles much shorter than the flowers, linear, pubescent. *Corolla-tube* narrow, puberulous or tomentose, pink or white, throat hardly dilated; lobes erect, much shorter than their recurved hispid dorsal spur, glabrous within. *Fruit* not seen.

29. **O. nutans,** *C. B. Clarke*; stem erect and cymes rough with crisped hairs, leaves elliptic-lanceolate acuminate glabrous above or with scattered hairs, nerves pubescent beneath, stipules large subulate-lanceolate ciliate entire or 2-fid, cymes contracted peduncle very stout deflexed, bracteoles large lanceolate or linear-oblong ciliate, calyx-teeth ovate acute, corolla $\frac{2}{3}$ in. villous within tubular glabrous, lobes short broad, capsule hispid.

SIKKIM HIMALAYA, alt. 7000 ft., *Dr. Treutler.* KHASIA MTS., alt. 5–8000 ft., *C. B. Clarke.*

Stem creeping below, then erect. *Leaves* 3–5 in., lurid when dry. *Cyme* 1–2 in. diam., flat-topped; branches thick, suberect; bracteoles half as long as the flowers. *Calyx-tube* globose, hispid, teeth glabrous. *Corolla* tubular, dilated at the base, narrowing upwards, white.

30. **O. pauciflora,** *Hook. f.*; stem extensively creeping slender pubescent as are the petioles leaf-nerves beneath and cymes, leaves ovate obtuse or subacute glabrous or with a few scattered hairs above, stipules small filiform, cymes small contracted few-flowered, bracteoles linear ciliate persistent, calyx-teeth lanceolate obtuse, corolla $\frac{1}{4}$ in. funnel-shaped, tube glabrous, lobes very short broad hispid at the back. Ophiorrhiza No. 18, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T., C. B. Clarke.*

A small, slender, prostrate species. *Leaves* $\frac{3}{4}$–2 in., lurid green. *Cymes* lax, $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; branches erect, 3–4-flowered; bracteoles half as long as the flowers. *Calyx* pubescent, teeth longer than the compressed tube. *Fruit* not seen.

31. **O. glechomæfolia,** *Thw. Enum.* 140; small, creeping, hispidly pubescent or tomentose throughout, leaves broadly elliptic or orbicular-ovate apiculate, stipules obscure, cymes small contracted hispid, bracteoles linear ciliate persistent, calyx-lobes membranous ovate-lanceolate ciliate much larger than the minute ovary, corolla $\frac{1}{10}$ in.

CEYLON; in forests of the central province, *Thwaites.*

The smallest of the Indian species; branches creeping nearly throughout their length, rather stout. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., lurid green, sometimes almost cordate, very hairy on both surfaces. *Cymes* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; peduncle slender, longer or shorter than the leaves; flowers pedicelled, white.

DOUBTFUL SPECIES.

O. ERUBESCENS, *Wall. Cat.* 6233: stem woody, scaberulous, leaves 4–6 in. elliptic- or ovate-lanceolate obtusely acuminate glabrous above whitish and puberulous beneath, flowers not seen.

AVA; Chappedong hills, *Wallich.*

26. **PAROPHIORRHIZA,** *C. B. Clarke.*

A very small villous herb; branches round; habit altogether of *Ophiorrhiza*. *Leaves* opposite, petioled; stipules deciduous. *Cymes* axillary, long-peduncled, ultimately ebracteolate; flowers small, scattered. *Capsule* widely-obovate, divaricate, two-horned at the summit, dehiscent as in *Ophiorrhiza*. *Seeds* very many, black, spherical, covered with raised points.

This genus closely resembles *Ophiorrhiza* and *Polyura*, but the seeds are altogether different; the cymes are not clearly secund.

1. **P. khasiana,** *C. B. Clarke.*

KHASIA MTS.; Churra Coal Hill, alt. 4200 ft., *C. B. Clarke.*

Woody stem, very short; annual flowering branches decumbent, short. *Leaves* $2\frac{1}{4}$ by 1 in., oblong, narrowed at each end, not very acute; petiole $\frac{1}{4}$ in. *Peduncles* 1–$2\frac{1}{2}$ in. *Capsule* $\frac{1}{8}$ by $\frac{1}{5}$ in.—Described from Mr. Clarke's mss.

27. **CARLEMANNIA,** *Benth.*

Branched herbs. *Leaves* obliquely elliptic, crenate-serrate; stipules of minute interpetiolar teeth. *Flowers* small, white, yellowish or pink, in terminal peduncled cymes. *Calyx-tube* subglobose; lobes 4–5, unequal, persistent. *Corolla* tubular; lobes 4–5, short, subequal, subimbricate in bud. *Stamens* 2, in the middle of the tube, filaments short, flattened; anthers dehiscing laterally included. *Disk* 2–4-lobed or -parted. *Ovary* 2-celled; style filiform, stigma clavate 2-fid; ovules numerous, on basal ascending placentas. *Capsule* membranous, more or less pyramidal and 4-lobed, 2-celled, loculicidally 2-valved, many-seeded. *Seeds* minute, ovoid, testa smooth or reticulated, adhering to the granular or horny albumen; embryo microscopic.—DISTRIB. Indian.

1. **C. Griffithii,** *Benth. in Hook. Kew Journ.* v. 308; cymes glabrous or puberulous, bracteoles and calyx-teeth small, capsule obscurely pyramidal 4-lobed.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2–6000 ft. KHASIA MTS., alt. 2–5000 ft., *Griffith*, &c.

A tall branched herb, glabrous except the cymes. *Leaves* 3–5 in., caudate-acuminate, membranous, serrate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cymes* open, panicled or corymbose, 1–$1\frac{1}{2}$ in. diam.; bracteoles $\frac{1}{10}$ in., linear; flowers yellow, $\frac{1}{3}$ in. *Calyx-tube* globose; lobes linear-oblong, obtuse. *Corolla-limb* narrowly funnel-shaped; lobes small, rounded. *Capsules* $\frac{1}{6}$ in. diam.

2. **C. congesta,** *Hook. f. in Herb. Ind. Or.*; cymes sparsely hispid, bracteoles large oblong ciliate, calyx-teeth oblong-lanceolate ciliate much larger than the ovary, capsule broadly pyramidal sparsely hispid.

SIKKIM HIMALAYA, alt. 4–7500 ft., *J. D. H. & T. T.*, *C. B. Clarke.*

Foliage and habit of *C. Griffithii*, but leaves sparsely hairy on both surfaces, cymes often dense-flowered with large bracteoles, calyx quite different, corolla sparsely hispid, larger, more funnel-shaped, with larger lobes.

3. **C. tetragona,** *Hook. f.*; cymes pubescent, branches elongate slender with subsessile secund flowers, bracteoles minute, calyx-teeth linear erect much longer than the ovary, capsule broadly pyramidal and stellately 4-lobed.

MISHMI HILLS; in shaded cultivated places, *Griffith* (Kew Distrib. 2841).

Apparently a prostrate shrub rooting at the nodes, with ascending pubescent branches. *Leaves* 1–$2\frac{1}{2}$ in., with scattered pubescence on both surfaces. *Cyme-branches* 1–2 in., suberect, very slender, bearing on one side distant single or pairs of shortly

pedicelled flowers ¼ in. long. *Corolla* pubescent. *Capsules* ⅛ in. diam., broader than long, much contracted at the tip, base flattened; lobes 4, stellately spreading. *Seeds* reticulate.—A very remarkable species.

28. SILVIANTHUS, *Hook. f.*

A glabrous branched shrub. *Leaves* broad, irregularly toothed; stipules 0. *Flowers* rather large, purplish, in subsessile dense-flowered opposite axillary cymes; bracts oblong, obtuse. *Calyx-tube* obconic; lobes 5, rarely 4, subfoliaceous, unequal, enlarging after flowering, persistent. *Corolla* funnel-shaped, tube hairy within; lobes 5, short, orbicular, papillose, induplicate-valvate with plaited sinuses. *Disk* large, conic. *Stamens* 2 in the corolla-tube, filaments short; anthers linear-oblong. *Ovary* 2-celled; style long, stigma spindle-shaped; ovules many, on globose placentas attached to the septum. *Fruit* fleshy, 2-celled, dehiscing from the top to the base between the calyx-lobes into 5 valves, and exposing the many-seeded placentas. *Seeds* rather large, imbricate, obliquely oblong, testa spongy; embryo minute, in fleshy albumen.

1. **S. bracteatus,** *Hook. f. Ic. Pl.* t. 1048. Psychotria, *Wall. Cat.* 8367.

SILHET and CACHAR, *De Silva, Griffith*, &c.

Stem stout, 2–3 ft., branched, woody. *Leaves* 6–10 in., elliptic, acuminate, membranous; petiole 1–3 in. *Cymes* 1–2 in. diam., broader in fruit. *Corolla* ½ in. long, white. *Fruit* ½ in. diam., crowned with the enlarged membranous or subcoriaceous calyx-lobes.

TRIBE V. MUSSÆNDEÆ.

29. MUSSÆNDA, *Linn.*

Shrubs or undershrubs, rarely herbs, erect or climbing. *Leaves* opposite or 3-nately whorled; stipules solitary or in pairs between the petioles. *Flowers* yellow scarlet or rarely white, in terminal cymes; bracts and bracteoles deciduous. *Calyx-tube* oblong or turbinate; lobes 5, usually deciduous, one frequently forming a large petioled white or coloured leaf. *Corolla* tubular, funnel-shaped above, tube usually silky, throat villous; lobes 5, valvate in bud with everted margins. *Stamens* 5, on the throat of the corolla or lower down, filaments very short; anthers linear. *Ovary* 2-celled; style filiform, stigmas 2 linear; ovules numerous, on peltate fleshy placentas. *Berry* fleshy and areolate at the top, many-seeded. *Seeds* minute, testa pitted; embryo minute, in dense fleshy albumen.—DISTRIB. Species about 40, tropical African, Asiatic, and Polynesian.

It is a very difficult thing to assign limits to the species of this genus, and more so to define them.

* *Flowers solitary; calyx-teeth all similar, none white and leaf-like.*

1. **M. uniflora,** *Wall. Cat.* 6264; hairy, stem very slender prostrate and ascending, leaves small ovate subacute or obtuse, flowers solitary, calyx hirsute teeth subulate equalling the ovary, corolla hairy, tube slender, lobes large oblong lanceolate. Acranthera uniflora, *Kurz in Journ. As. Soc.* 1872. ii. 312; 1877, ii. 160.

MARTABAN and TENASSERIM; at Tavoy, *Gomez*; Moulmein, *Parish*, &c.

Stem 6–10 in., simple or branched, terete. *Leaves* subsessile or petioled, 1–1¼ in., with scattered hairs on both surfaces. *Flowers* sessile or peduncled, terminal or axillary. *Corolla* nearly 1 in. long, and as much across the subacute membranous lobes, white. *Berry* ellipsoid, hirsute, with a few calyx-teeth remaining.

** *Flowers in cymes; calyx-teeth persistent till the fruit is ripe.*

2. **M. Roxburghii,** *Hook. f.*; erect, stem hairy above, leaves short-petioled oblong-lanceolate glabrous above, stipules triangular-lanceolate, cymes very dense many-flowered crinite from the filiform hairy calyx-teeth, corolla silky, tube narrow, lobes very small with filiform tips, berries glabrous, crowned with the calyx-lobes. M. corymbosa, *Wall. Cat.* 6252 A. B. *in part*, C. D. *in part.* ? M. corymbosa, *Kurz For. Fl.* ii. 58. ? M. pubescens, *Wall. Cat.* 6257 B. M. frondosa, *Wall. Cat.* 6250 E.? and C. *in part.* Mussænda, No. 18 and 19, *Herb. Ind. Or. H. f. & T.*

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 1–4000 ft., *Herb. Griff.* (Kew Distrib. 2780), *J. D. H.*, &c. KHASIA MTS., *Gomez*, &c.; alt. 3–4000 ft., *J. D. H. & T. T.* CACHAR, *Keenan.* CHITTAGONG, *J. D. H. & T. T.* ? ARRACAN and TENASSERIM, *Kurz.*

This is the *M. corymbosa* of the Calcutta Gardens, and of Roxburgh, according to Wallich, but is certainly not the plant described under that name by Roxburgh in the Flora Indica, which has "ovate-lanceolate bracts," and ovate pointed lobes of the corolla, which are "convex and villous above," and which is stated to be a native of Ceylon and Malabar. There is, however, on one of Wallich's sheets of this plant a single specimen of a plant, also from the Calcutta Gardens, which agrees better with Roxburgh's description, having large convex pubescent corolla-lobes, and which probably does not differ from the *M. frondosa* of Malabar and Ceylon. *M. Roxburghii* is best known by its dense cyme, long tube and small limb of the corolla, with a filiform tip; the leaves are always glabrous above, and the fruit globose and glabrous; the large white calycine leaf is always glabrous. Wallich's 6257 B, a Calcutta Garden plant, is certainly not *pubescens*, and has the filiform corolla-lobes of *M. Roxburghii*, but differs in the branches clothed with spreading hairs. There are two varieties of *M. Roxburghii.*

VAR. 1; branches nearly glabrous, leaves oblong-lanceolate 4–6 by 2 in., and bracts and flowers silky.—Assam, Silhet, Cachar, Chittagong.

VAR. 2; branches more or less villous above, leaves longer petioled broader and more membranous elliptic 6–12 in., bracts and flowers villous.—Nipal, Sikkim, Khasia Mts., alt. 3-4000 ft.

3. **M. incana,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey,* ii. 229; *Cat.* 6256; stem erect subsimple softly tomentose or villous as are the leaves beneath and cymes, leaves shortly petioled ovate subacute hairy above white beneath, calyx-teeth filiform twice as long as the ovary, corolla silky, lobes ovate acuminate, berry globose with subpersistent calyx-teeth. *DC. Prodr.* iv. 371. M. pubescens, *Ham. in Wall. Cat.* 6257.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 2–4000 ft., *Herb. Griffith* (Kew Distrib. 2781, 2782), *J. D. H.* ASSAM; Sukanugur and Goalpara, *Hamilton.* KHASIA MTS., alt. 2000 ft., *Griffith, J. D. H. & T. T.*

Stem erect, simple and herbaceous or branched, 2–3 ft., covered with soft shining appressed hairs. *Leaves* 5–6 in., stiff, rounded or acute at the base, nerves many and strong; stipules tapering from a broad base, bifid. *Cymes* small, subsessile. Leafy white *calyx-lobe* pubescent. *Corolla* ¾ in. long; tube slender. *Berries* at first hairy, then glabrous; areola small.

4. **M. Keenani,** *Hook. f.*; subherbaceous, very robust, leaves petioled broadly elliptic acuminate coriaceous densely tomentose beneath, nerves very strong, stipules very broadly ovate acuminate, cymes dense-flowered glabrous or pilose crinite with the filiform calyx-teeth, corolla glabrous, tube slender, lobes small ovate-lanceolate acuminate.

CACHAR; on the margins of flats, &c., *Keenan.*

A remarkable plant, described by its finder as herbaceous, large and robust in all

its parts, and flowering later than the other Cachar species. It may be a form of *M. incana* or *Roxburghii*, but if so it is a remarkable one.—*Stem* as thick as the little finger, pubescent above. *Leaves* 8–12 by 4–6 in., thick and leathery, quite glabrous above, abruptly acuminate; petiole ½–2 in., very robust; stipules ½–⅔ by ¼ in., leathery, hairy, erect or recurved. *Cymes* 2–3 in. diam., almost capitate, on stout peduncles. *Calyx-teeth* ½ in. *Corolla* nearly 1 in. long. *Buds* obtuse (without subulate points).

5. **M. tomentosa,** *Wight in Wall. Cat.* 6265; erect, shrubby, branches and leaves on both surfaces densely clothed with velvety tomentum, leaves all petioled ovate-elliptic or ovate-lanceolate acute or obtuse white beneath, stipules narrow 2-fid, cymes sessile contracted, bracts and calyx-teeth elongate subulate twice as long as the ovary, corolla velvety, tube 1 in., limb 1¼ in. diam., lobes broad acute, berry puberulous crowned with the long calyx-teeth. *W. & A. Prodr.* 394?

CARNATIC; Ginger Hills, amongst masses of rock in shade, *Herb. Wight.*

Leaves 3–5 in., narrowed into the petiole. *Cymes* with no leafy white calyx-lobes.—A very distinct species, badly described by Wight and Arnott as hirsutely villous, the pubescence being singularly soft, velvety and close, more so than in any other species. It resembles in some respects var. 2 of *M. frondosa*, but is distinguished by the dense soft pubescence, the much larger flowers, and persistent calyx-teeth. It is not the *M. tomentosa* of Wight's own Herbarium, No. 1271, which is var 7 of *M. frondosa*, and from which possibly the description in the Prodromus is taken; there is, however, a specimen of this in Wight's own Herbarium, marked in mss. 1271 A.

6. **M. Wallichii,** *G. Don Gen. Syst.* iii. 490; glabrous, leaves elliptic ovate or lanceolate acuminate nerves beneath pubescent, stipules long gradually narrowed from the base entire or 2-fid, cymes glabrous, bracts subulate, calyx-teeth half as long as the elongate ovary or longer, corolla quite glabrous, tube slender, lobes narrow finely acuminate, berries subglobose with persistent calyx-teeth. M. longifolia, *Wall. Cat.* 6258. M. glabra, *Wall. Cat.* 6251 A. *in part.* M. Jelinckii, *Kurz in Journ. As. Soc.* 1876, ii. 135.

RANGOON, *Wallich, McLelland*; and TENASSERIM, at Tavoy, *Gomez.* GREAT NICOBAR ISLAND, *Jelinck.*

Branches robust. *Leaves* in small specimens 4–5 by 2 in., elliptic, sometimes broadly, in larger ones much longer, 12 by 4½ in., usually abruptly or caudately acuminate, rather membranous, quite glabrous above; stipules narrow, ⅜–½ in., persistent, erect. *Cymes* lax-flowered, quite glabrous, as are the white calycine leaves. *Corolla-tube* 1 in.; lobes ⅙ in., glabrous.—Very variable in foliage, and sometimes approaching *M. glabra*, but the cymes are always glabrous and the calyx-teeth persistent. Kurz's Nicobar specimen (*M. Jelinckii*) has very small calyx-teeth and obliquely oblanceolate very membranous leaves, with slender petioles, very like those of *M. Griffithii*, which differs in the silky corolla.

7. **M. Griffithii,** *Wight mss. in Herb.*; branches with stiff appressed hairs, leaves petioled 12 by 3 in. obliquely oblanceolate finely acuminate very membranous, midrib and very slender nerves beneath hairy, petiole slender 1–2 in., stipules 2-fid villous, cymes sessile with several short hispid dense-flowered branches crinite with the filiform bracts and calyx-teeth which latter are twice as long as the ovary and persistent in the young fruit, corolla 1 in., tube slender silky, lobes narrow acuminate, berries ovoid glabrous.

TENASSERIM; Mergui, *Griffith.*

The only specimen I have seen is in Wight's Herbarium, and the leaves entirely resemble those of *M. Jelinckii*, but the corolla is densely silky, and the calyx-teeth very long, as in *M. Roxburghii* and in *pavettæfolia*, which has a glabrous corolla. The white calycine leaves are 2–3 in. long, ovate-lanceolate with very long points.

*** *Flowers in cymes, calyx-teeth deciduous almost immediately after flowering.*

8. **M. macrophylla,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 228; erect or subscandent, branches leaves beneath and cymes hirsute or villous, leaves short-petioled broadly elliptic acute, bracts and calyx-lobes foliaceous oblanceolate obtuse caducous, corolla lobes orbicular apiculate, berries hairy. *Wall. Pl. As. Rar.* ii. 77, t. 180; *Cat.* 6295; *Bot. Reg.* xxxii. t. 24; *DC. Prodr.* iv. 370. M. hispida, *Don Prodr.* 139; *DC. l. c.* M. calycina, *Wall. Cat.* 6253; *Kurz For. Fl.* ii. 58. M. frondosa, *Wall. Cat.* 6250 A.

TROPICAL HIMALAYA; Nipal, *Wallich.* KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T., C. B. Clarke.* PEGU and ANDAMAN and NICOBAR ISLANDS, *Kurz.* MALAY PENINSULA, *Maingay* (Kew Distrib. 8357/2 and ? 941).—DISTRIB. Ava, Philippine Islands.

Usually a subscandent shrub; branches stout; hairs rufous when dry. *Leaves* 4–10 by 2–3½ in., slightly hairy above; stipules acute or 2-fid, broad, recurved. *Cymes* short-peduncled, often 3-chotomous; flowers crowded; bracts large, laciniate. *Calyx-lobes* ½–¾ in., nerves parallel, leafy white lobe 2–5 in. *Corolla* 1 in., tube hirsute, lobes orange, throat villous. *Berries* broadly ellipsoid, ½ in. long; areole very broad.—Kurz distinguishes *M. calycina* as a scandent shrub with lanceolate calyx-teeth ½ in. long, and corolla-lobes ¼ as long as the corolla-tube, from *M. macrophylla,* which is a large shrub, or small tree, with calyx-teeth ⅙–¼ in. and corolla-lobes nearly ½ as long as the corolla-tube; but his *macrophylla* is not the *Wallichian* plant of that name, and is, I think, *M. frondosa,* var. 5.

9. **M. frondosa,** *Linn.*; *DC. Prodr.* iv. 370; glabrate tomentose or hirsute, leaves sessile or petioled elliptic oblong or ovate acuminate, stipules long or short often 2-fid, cymes contracted or open softly silkily tomentose, bracts and caducous calyx-lobes elongate-lanceolate much longer than the ovary, corolla pubescent silky or hirsute, lobes broadly ovate acute or acuminate, berries obovoid glabrous, areole broad. *Roxb. Fl. Ind.* i. 557; *Wall. Cat.* 6250 *in part*; *Wight Ill.* t. 124; *Dalz. & Gibs. Bomb. Fl.* 111; *Bedd. Fl. Sylv. Anat. Gen.* xvi. f. 3. M. flavescens and M. Dorinia, *Ham. in Trans. Linn. Soc.* xiv. 203. M. formosa, *Linn. Mant.* 338. M. villosa, *Wall. Cat.* 6254. ? M. corymbosa, *Roxb. Fl. Ind.* i. 556. M. zeylanica, *Burm. Fl. Zeyl.* 165, t. 76.—*Rheede Hort. Mal.* ii. t. 18.

TROPICAL HIMALAYA, from Nipal eastward; ASSAM, KHASIA MTS., alt. 1–4000 ft.; ANDAMAN ISLANDS, *Kurz.* WESTERN PENINSULA, from the Concan southwards.—DISTRIB. Malay Islands.

It is difficult to limit this species, which passes into *M. glabra* on the one hand, and almost into *M. macrophylla* on the other; and quite impossible to define its varieties, which may be approximately diagnosed as follows.

VAR. 1. *zeylanica*; branches leaves on both surfaces especially beneath and cymes velvety, leaves sessile or shortly petioled 3–6 in. abruptly acuminate, base acute rarely rounded, stipules short and broad, cymes tomentose, bracteoles and calyx-lobes ¼–⅓ in. lanceolate not twice the length of the ovary, white leafy lobe orbicular elliptic or cordate pubescent, corolla-tube densely tomentose, limb quite obtuse in bud, lobes short broad subacute.—Ceylon only.—I have not seen the berries, which Vahl (under *M. glabra*) states to be hairy.

VAR. 2. *ingrata*; branches leaves and cymes velvety, very like those of var. 1, stipules short and broad, cymes contracted crinite from the long lanceolate subsetaceous bracts and calycine lobes which are ⅓–⅔ in. long, greatly exceeding the ovary, corolla as in var. 1 but limb with 5 points in bud.—*Wall. Cat.* 6250 F.; *Wight Cat.* 1267. M. ingrata, *Wall.?*

VAR. 3. *laxa*; branches stipules and cymes finely densely tomentose, leaves all petioled broadly elliptic rounded at the base with fine short appressed hairs, stipules short 2-fid, cymes very open lax-flowered, bracteoles and calyx-teeth as in var. 2 but spreading, corolla as in var. 2.—Quillon, *Wight.*

VAR. 4. *glabrata*; branches glabrous or with scattered spreading hairs, leaves all petioled broadly or narrowly elliptic glabrous or sparingly hairy beneath or on both surfaces, stipules sometimes very narrow, cymes open with long bracts and calyx-teeth as in var. 3, corolla-tube silky, lobes apiculate as in var. 3.—*Wall. Cat.* 6250 A. C. G., *all for the most part*; *Wight Cat.* 1269, 1270 (a form with lanceolate white calycine leaf).—The common Western Peninsula form. Fruit hairy in a specimen from Stocks.

VAR. 5. *grandifolia*; branches with spreading hairs, leaves all petioled 6–12 in. often almost as broad, elliptic abruptly acuminate membranous glabrous above acute at both ends more or less pubescent on the nerves beneath, stipules broad 2-fid, cymes large contracted, bracts and calyx-teeth lanceolate broader than in the southern forms, flowers larger, buds with 5 points, corolla-limb broad acuminate.—Nipal, *Wall. Cat.* 6250 E.; Sikkim, alt. 2–6000 ft., *J. D. H.*, *Treutler*; Assam, *Jenkins*, *Griffith*; Khasia Mts., 2–5000 ft., *J. D. H. & T. T.* ? M. macrophylla, *Kurz For. Fl.* ii. 57, *not of Wallich*.—This approaches forms of *M. Roxburghii*, but has a much larger flower and broader bracts and calyx-teeth, which latter are deciduous. Large calycine white leaf sometimes 6 by 4 in.

VAR. 6. *hirsutissima*; branches cymes petioles and leaves on both surfaces hirsute with often shaggy hairs, leaves subsessile 2–3 rarely 4 in. broadly ovate-elliptic rarely elliptic-lanceolate, stipules short, cymes shortly stoutly peduncled contracted few-flowered, bracts and calyx-lobes $\frac{1}{3}$–$\frac{3}{4}$ in. broadly lanceolate, flowers very large, corolla hirsute often $1\frac{1}{4}$ in. long and 1 in. across the lobes, tube slender or very broad sometimes $\frac{1}{3}$ in. diam. at the base and slightly contracted above it, lobes broad apiculate, berry large globose, leafy calyx-lobe often absent cordate.—M. frondosa, *Wall. Cat.* 6250 H. (*from Herb. Heyne*); var. β. *Wight Cat.* 1268. M. tomentosa, *Wight Cat.* 1271 (*not of Wallich*). M. villosa, *Schlecht. in Pl. Hohenack.* N. 1382. Nilgherry, Pulney, Shevaroy, and Shevaghery hills, *Wight*; Concan, alt. 6–8000 ft., *C. B. Clarke*, who remarks that the broader flowers are injured by insects, and have the corolla-tube within glabrous below the throat and larger disk-glands; a similar state is also recorded from Java.—Probably a distinct species, but it appears to pass into forms of *frondosa*.

10. **M. variolosa,** *Wall. Cat.* 6259; scandent, hispid with spreading rufous hairs, leaves subsessile lower petioled ovate or oblong or obovate-oblong acuminate, stipules small, cymes small 2–3-chotomous, calyx-teeth equalling the ovary or shorter deciduous in fruit, corolla-tube slender glabrate or hirsute, lobes small broad not pointed, berries broadly obovoid. *G. Don Gen. Syst.* iii. 490; *Kurz For. Fl.* ii. 56.

TENASSERIM, PEGU, and ARRACAN, common, *Wallich*, *Helfer*, &c. (Kew Distrib. 2777.)

Apparently a slender climbing species. *Leaves* membranous hairy on both surfaces or glabrate above, upper sessile 3–4 by $1\frac{1}{2}$–2 in., lower often more elongate and narrowed into a slender petiole, rarely all petioled. *Cymes* generally rather open with spreading branches and pedicelled flowers, sometimes dense. *Flowers* small for the genus. *Calyx-teeth* very variable, sometimes elongate after flowering; leafy white one small 2 in. long, orbicular or broadly elliptic, obtuse, glabrous or puberulous. *Berries* glabrous, small, sometimes covered with broad pale warts.

11. **M. glabra,** *Vahl Symb.* iii. 38; a rambling or climbing almost glabrous shrub, leaves shortly petioled elliptic or oblong acuminate, nerves beneath often hairy, stipules small simple or 2-fid, cymes glabrous or sparsely appressed-hairy branched, bracts and calyx-teeth subulate or lanceolate shorter or longer (never twice as long) as the ovary early deciduous after flowering, corolla-tube 1 in. very slender glabrous or with appressed hairs, lobes very short acute, berries globose glabrous. *DC. Prodr.* iv. 370; *Wall. Cat.* 6251; *Kurz For. Fl.* ii. 56. M. penangensis, *Miq. Fl. Ind. Bat.* ii. 214. M. frondosa, *Wall. Cat.* 6250, B. and E. both in part.

NIPAL and SIKKIM HIMALAYA, alt. 1–5000 ft.; ASSAM, KHASIA MTS., alt. 0–4000 ft.; CACHAR, CHITTAGONG, TENASSERIM (*Helfer*, Kew Distrib. 2778; *Griffith*, 2775, 2776); SINGAPORE; MALACCA (*Maingay*, Kew Distrib. 834; *Griffith*, 2779) and PENANG.—DISTRIB. Malay Islands.

The very glabrous habit, rather coriaceous leaves, smaller calyx-teeth, long slender hairy (rarely glabrate) corolla-tube, and small broad acute corolla-lobes, distinguish this from its allies. The leaves do not exceed 5 inches in length; the calycine white leaf is never more than 3 in. long, very broad obtuse and glabrous; the calyx-teeth vary from quite minute to almost twice as long as the ovary; the berries are sometimes mottled as in *M. variolosa.*

VAR. 1; leaves narrowed at the base glabrous or sparsely pubescent beneath, calyx-teeth subulate about equalling the ovary.—From Sikkim and Bhotan to Chittagong.

VAR. 2; leaves narrowed at the base glabrous or softly pubescent beneath, calyx-teeth lanceolate longer than the ovary.—Malacca and Singapore.

VAR. 3; leaves acute or rounded at the base quite glabrous, calyx-teeth equalling or shorter than the ovary.—Tenasserim (fruit not seen).

VAR. 4; leaves usually obtuse or rounded at the base setulose on the midrib above. M. setulosa, *Klotzsch in Monatsb. Berlin. Akad.* 1853, 510.—Pegu to Penang.

IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.

M. CORDIFOLIA, *Wall. Cat.* 6260; glabrous, branches woody, leaves subsessile ovate-cordate rather coriaceous, fruiting cyme often sparsely hairy, berries obovoid glabrous areola large without calyx-teeth.—Penang, *Wallich.*

M. MACROPHYLLA, *Kurz Herb.* (? *of For. Fl.* ii. 57, *not of Wallich*); branches glabrous, leaves 7–10 by 3–4½ in. broadly elliptic or obovate acuminate very membranous, nerves beneath hairy, petiole ½–1 in., stipules subulate-lanceolate hairy, cymes silky, flowers crowded, calyx-lobes much longer than the ovary and bracteoles lanceolate, corolla hirsute (in bud only), large white calycine leaf 4–6 in. long glabrous.—A small tree, South Andaman Island, *Kurz.* Probably a form of *M. frondosa*, var. 5.

M. PAVETTÆFOLIA, *Kurz For. Fl.* ii. 57; branches tomentose, leaves 10–12 in. shortly petioled oblanceolate caudate-acuminate very membranous glabrous above pubescent on the nerves beneath, stipules broadly triangular acuminate, cymes small axillary and terminal very shortly peduncled villous, calyx-teeth filiform hairy longer than the ovary, corolla (in bud) quite glabrous.—Pegu, at Tonkyeghat, *Kurz.*

M. PARVA, *Wall. Cat.* 6261; *G. Don Gen. Syst.* iii. 491; stem very slender scandent, sparsely hairy as are the leaves beneath, and sometimes above, leaves 2 in. subsessile lanceolate subacute, stipules small, cymes subsessile contracted villous, bracts and calyx-teeth subulate much longer than the ovary, corolla 1 in., tube very slender appressed-pubescent, lobes small acute.—This, from its slender habit and foliage, appears distinct from any described species.—A single specimen from Tavoy.

M. VILLOSA, *Wall. Cat.* 6254; climbing, branches and leaves beneath almost hispid with spreading rufous hairs, leaves 3–4 in. subsessile ovate or elliptic with scattered hairs above finally glabrate abruptly acuminate, cymes with spreading hispid branches and appressed hirsute bracts and calyx-teeth which are lanceolate and much longer than ovary, corolla ½–⅔ in., tube very slender with appressed hairs, lobes small broadly ovate not apiculate.—Penang, *Wallich*, *Phillips.*—This resembles a very hairy *M. glabra*, or a form of *variolosa*, but the bracts and calyx-teeth are much longer; the flowers are smaller than in any form of *frondosa.*

M. CORYMBOSA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 556; *W. & A. Prodr.* 393.—This is a Calcutta garden plant of Roxburgh's, which he states to be a native of Malabar and Ceylon, and to differ from *M. frondosa* in being glabrous, amongst other characters. No Ceylon or Malabar plant known to me answers to his description, or to a figure of a Calcutta Garden plant which bears this name in a collection of drawings at Kew made for Dr. Roxburgh (not the Roxburghian drawings cited by W. & A.). Wallich's *M. corymbosa*, Roxb. 6252, consists of two plants, of which one (A. B. in part, C. and D.), from the Khasia Mts. and Nipal, differs wholly from Roxburgh's description, and is that I have called *Roxburghii*; the others (B. in part and D. in part, both from Calcutta Garden) do agree with his description and drawing in the

glabrousness of the corolla and the very large stipules. I have seen neither of these last in fruit, or from their native locality; they may be forms of the protean *M. frondosa*. Wight and Arnott refer Roxburgh's drawing marked *M. frondosa* (from the Indian Museum collection) to *M. corymbosa*, Roxb., I do not know on what authority. *M. corymbosa* hence remains a doubtful plant, allied to *M. Roxburghii*, differing in the very large persistent stipules, and large glabrous flowers with broad not appendaged corolla-lobes. As Roxburgh does not describe the calyx-teeth as persisting on the berry it may be assumed that they are caducous, as in *M. frondosa*.

M. CUNEIFOLIA, *Don Prodr.* 139; branches and cuneate-oblong acuminate leaves on both surfaces pubescent, bracts lanceolate, calyx-teeth linear acute 5 times shorter than the corolla. -Nipal, *Wallich*. This is probably *M. incana*, but the description applies as well to *M. frondosa*, *Roxburghii*, *glabra*, and *macrophylla*, all Nipalese species.

30. ACRANTHERA, *Arn.*

Hairy herbs or low undershrubs. *Leaves* large, membranous, stipules triangular. *Flowers* blue, in sessile or stoutly peduncled subterminal bracteate cymes. *Calyx-tube* oblong; segments 5, usually very long and persistent. *Corolla* funnel- or salver-shaped, hairy without; lobes short, valvate in bud with everted margins. *Stamens* 5, included within the tube, filaments filiform; anthers included, cohering in a tube, pointed and spurred at their tips. *Ovary* 1-celled; style filiform, stigma clavate furrowed; ovules numerous, on 2 parietal 2-lamellate placentas. *Berry* oblong or fusiform, 2-celled, many seeded. *Seeds* minute, subglobose, testa crustaceous pitted; embryo clavate, in dense albumen. —DISTRIB. Species 10, Indian and Malayan.

1. **A. Maingayi,** *Hook. f.*; stem slender woody, leaves elliptic abruptly acuminate glabrous, cymes terminal, calyx-lobes oblong-lanceolate, corolla-tube very slender tomentose, lobes ovate-lanceolate.

MALACCA, *Maingay* (Kew Distrib. 940).

Stem branched. *Leaves* 5–7 by 2½–4 in., very membranous, base acute or rounded, petiole slender; stipules triangular-lanceolate, 2-fid. *Cymes* subsessile. *Calyx-lobes* ¼ in., puberulous, acute, deciduous. *Corolla-tube* 1½ in., throat not swollen; limb 1¼–1½ in. diam., divided nearly to the base into pubescent lobes. *Berry* ½ in., ellipsoid, 2-celled, areolate, not crowned by the calyx-lobes.

2. **A. Griffithii,** *Hook. f.*; stem slender woody, branchlets and petioles silky, leaves broadly elliptic abruptly acuminate finely pubescent beneath, cymes terminal, calyx-lobes linear-lanceolate, corolla-tube very slender tomentose, lobes lanceolate acuminate.

EASTERN HIMALAYA, *Griffith* (Kew Distrib. 3089).

This so closely resembles *A. Maingayi* that I doubt its locality being correct; it differs in the silky branchlets and petioles, the much longer narrower calyx-lobes ⅓ in. long, and the larger corolla with the limb 2¼ in. diam. with lanceolate lobes, and the throat dilated and cylindrical.

3. **A. tomentosa,** *Br. in Wall. Cat.* 8398 (Androtropis); hirsutely tomentose, stem very stout, leaves elliptic or oblanceolate acute hirsute on both surfaces, cymes short-peduncled subterminal, calyx-lobes linear-lanceolate, corolla villous, tube funnel-shaped, lobes short rounded.

KHASIA MTS., *De Silva*, *Griffith*. CACHAR, *Keenan*.

Stem short (epiphytic, *Keenan*) cylindric. *Leaves* 4–10 in., black when dry, rugose; stipules broad, acute. *Calyx-lobes* ⅔–1 in. *Corolla* 1½ in. long, blue ?, densely villous. *Ovary* long, fusiform. *Berry* 1½ in., with persistent calyx-lobes.

4. **A. zeylanica,** *Arn. in Ann. Nat. Hist.* iii. 21; hirsute, stem very short, leaves oblanceolate tip rounded hirsute on both surfaces, cymes subter-

minal usually long-peduncled, calyx-lobes linear-lanceolate, corolla villous, tube funnel-shaped, lobes oblong rounded. *Bedd. Ic. Pl. Ind. Or.* t. 24.

CEYLON; central province, alt. 3–5000 ft. on shaded banks, *Macrae*, &c.

A low herb. *Leaves* 4–7 by 1½–3 in., rugose, black when dry, narrowed into the petiole. *Cyme* and its stout peduncle densely hirsute. *Calyx-lobes* ¼–⅓ in. *Corolla* 1 in. long. *Berry* hirsute, ⅔ in., fusiform.

5. **A. grandiflora,** *Bedd. Ic. Pl. Ind. Or.* t. 25; silkily villous, stem short, leaves elliptic or oblong-obovate tip rounded glabrate above pubescent on the nerves beneath, cymes subterminal long-peduncled silky, calyx-lobes linear acute or obtuse, corolla villous, tube very long narrowly funnel-shaped, lobes oblong rounded.

TINNEVELLY; in moist forests, alt. 2–3000 ft., *Beddome*.

Very near *A. zeylanica*, but the pubescence of the stem and peduncle and cyme is more silky, the leaves glabrous or with soft hairs above, quite glabrous beneath between the nerves; the calyx-lobes are under ½ in. and quite linear, and the pale blue corolla-tube 1½ in. long.

6. **A. anamallica,** *Bedd. Ic. Pl. Ind. Or.* t. 25; almost stemless, leaves elongate obovate-oblong tip rounded with scattered bristly hairs above, pubescent on the nerves beneath, cymes subsessile silkily pubescent, calyx-lobes short ovate or elliptic spreading, corolla funnel-shaped pubescent, lobes oblong rounded.

TINNEVELLY; Anamallay Mts., alt. 4500 ft. in moist woods, *Beddome*.

Stem ½–1 in., with strong roots from the base. *Leaves* 2–6 by 1½ in., black when dry, narrowed to the base but not into the petiole, which is ½–¾ in., and densely tomentose. *Cymes* many-flowered, flowers pedicelled. *Calyx-lobes* ⅓ in. *Corolla* 1 in. long, deep blue.

31. LUCINÆA, *DC.*

Erect or twining glabrous shrubs. *Leaves* coriaceous, stipules small or large. *Flowers* white, 6–10 together, crowded on peduncled discoid receptacles which are axillary or terminal and solitary or umbelled. *Calyx-tube* turbinate, limb annular or cupular, quite entire persistent. *Corolla* funnel-shaped, tube broad, throat bearded, lobes 4, coriaceous, valvate in bud. *Stamens* 4, in the tube of the corolla, filaments short villous; anthers narrow, included. *Ovary* 2-celled; style filiform or thickened below the middle, stigmas 2 linear or spathulate; ovules numerous, on fleshy peltate placentas. *Berry* globose or turbinate, 2-celled, many-seeded. *Seeds* compressed, testa thickly coriaceous smooth; embryo minute in fleshy albumen.—DISTRIB. Species 6, Malayan.

1. **L. Morinda,** *DC. Prodr.* iv. 368; branches flexuous, leaves elliptic or ovate acute shortly petioled, stipules triangular. *Wall. Cat.* 8437. Morinda polysperma, *Jack in Mal. Misc.* i. 14; *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 204.

Littoral. SINGAPORE, *Jack*; Malacca, *Griffith, Maingay*; PENANG, *Wallich*.—DISTRIB. Malay Archipelago.

Erect, glabrous or nearly so, branches stout. *Leaves* 2–3 in., brown when dry, nerves slender; petiole ¼ in. *Peduncles* solitary in opposite axils, or terminal and often subumbellate. *Heads* ¾ in. diam., few-flowered. *Corolla* $\frac{1}{10}$ in., densely hairy within. *Berries* crowded, 6–8 in a head, broadly turbinate, areolate.

32. LEUCOCODON, *Gardn.*

A climbing glabrous epiphytic rooting shrub. *Leaves* coriaceous; stipules large, oblong, connate at the base, tip 2-toothed. *Flowers* white, in solitary terminal peduncled involucrate heads; involucre bell-shaped with the flowers

in the bottom. *Calyx-tube* subglobose; limb cylindric, irregularly split, persistent. *Corolla* funnel-shaped, throat glabrous; lobes 5, thickly coriaceous, valvate in bud. *Stamens* 5, inserted in the tube; anthers sessile, linear, included. *Ovary* 2-celled; style filiform, stigmas 2 linear thick; ovules crowded on broad peltate placentas. *Seeds* compressed, boat-shaped, testa thick striate; embryo minute, in fleshy albumen.

1. **L. reticulatum,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 5; *Thw. Enum.* 138; *Bedd. Ic. Pl. Ind. Or.* t. 94.

CEYLON; central province, alt. 3–5000 ft., *Walker, Gardner,* &c.

Branches stout. *Leaves* 3–4 by 1¼–1½ in., dark brown when dry, elliptic-lanceolate, acute, opaque above, shining and reticulate beneath; petiole ¼–1 in. *Involucre* shortly stoutly peduncled, 1½ in. long by 2 across the lobed mouth, sides much folded. *Corolla* 1½–¾ in. *Berries* ¼ in. diam., white.

33. POLYSOLENIA, *Hook. f.*

An erect glabrous undershrub? with a flexuous stem leafy towards the top. *Leaves* membranous; stipules large, erect, 3-fid or torn, persistent. *Flowers* in solitary terminal peduncled heads, sessile or pedicelled; peduncle naked or involucrate about the middle by torn stipular bracts; bracteoles 3-fid. *Calyx-tube* short, limb short, 5-fid. *Corolla* pubescent, tube slender funnel-shaped above, throat villous; lobes 5, short, valvate in bud. *Stamens* 5, inserted below the throat, filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, stigmas 2 short dilated; ovules very many, on oblong tumid peltate placentas. *Fruit* unknown.

1. **P. Wallichii,** *Hook. f. in Gen. Pl.* ii. 68. Morinda sp., *Wall. Cat.* 8424.

KHASIA MTS., *Gomez*; CACHAR, *Keenan.*

Stem cylindric, woody, simple or branched, glabrous or pubescent above. *Leaves* 3–5 in., brown when dry, lanceolate, acuminate, narrowed into a petiole, ¼–1 in., pubescent; nerves many, slender; stipules ⅓–½ in. *Heads* ½ in. diam., tomentose; peduncle 2–3 in., slender, pubescent; bracts few, irregular, ovate or linear-oblong; flowers subsessile. *Calyx-lobes* broadly ovate. *Corolla* 1–1¼ in. long, tube very slender pubescent, lobes obtuse.—In the absence of fruit the position of this genus remains doubtful.

34. TRISCIADIA, *Hook. f.*

A glabrous twining shrub, branches stout. *Leaves* softly coriaceous, nerves few; stipules short, broad, shortly connate below, acute or 2-toothed, caducous, leaving an annular scar. *Flowers* white, scented, in 3–6-flowered panicled or ternate peduncled terminal umbels; bracts and bracteoles 0 (perhaps caducous). *Calyx-tube* campanulate; limb membranous, cupular, 5-toothed, ciliate, deciduous. *Corolla* coriaceous, funnel-shaped; tube short, hairy within; throat glabrous; lobes 5, lanceolate, valvate in bud, with incurved tips. *Stamens* 5, on the throat of the corolla, filaments filiform; anthers slender, versatile, exserted. *Ovary* 2-celled; style filiform; stigmas 2 linear-lanceolate; ovules 2 or more in each cell, sunk in a fleshy placenta adnate to the septum. *Fruit* unknown.

1. **T. truncata,** *Hook. f. in Gen. Pl.* ii. 69. Webera truncata, *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 538. Stylocoryne truncata, *Wall. Cat.* 8403. Cupia truncata, *DC. Prodr.* iv. 394. Pseudixora truncata, *Miq. Fl. Ind. Bat.* ii. 210.

PENANG; on the hill, *Wallich.*

Branches cylindric, with pale smooth bark. *Leaves* 4–5 by 1½–2 in., elliptic, subacute, brown and shining when dry, nerves few; petiole ¼–⅓ in. *Peduncles* 1–2 in.; flowers few, small, shortly pedicelled. *Corolla* ⅓ in., fleshy, lobes longer than the tube.—This curious plant has been collected by Wallich alone in 1822.

35. ADENOSACME, *Wall.*

Small shrubs. *Leaves* very membranous, many-nerved; stipules oblong or lanceolate or foliaceous, sometimes toothed and glandular. *Flowers* white, yellow or greenish, in axillary and terminal panicled cymes with spreading branches; bracts often glandular. *Calyx-tube* globose or hemispheric, lobes 4–6, persistent. *Corolla* tubular, short or long; lobes 4–6, triangular, valvate in bud, with everted margins. *Stamens* 4–6, inserted in the tube, filaments short; anthers linear-oblong. *Ovary* 2- or 5–6-celled; style slender or thickened above, stigmas 2- or 5–6 linear; ovules very numerous, on fleshy peltate placentas. *Berry* small, globose, 4–6-lobed, coriaceous or fleshy, 2- or 5–6-celled, indehiscent or loculicidal at the crown, many-seeded, placentas globose. *Seeds* minute, angled, testa dotted; embryo minute, in fleshy albumen.—DISTRIB. Species 4–5, Indian and Malayan.

The flowers of this genus are di- or tri-morphic.

* *Berry 2-celled, white.*

1. **A. longifolia,** *Wall. Cat.* 6280; leaves elliptic-lanceolate, narrowed to a long acuminate point pubescent or puberulous beneath, stipules small oblong-lanceolate, cymes terminal and axillary sessile or shortly peduncled, branches slender divaricating, corolla ¼–¾ in. *Kurz For. Fl.* ii. 160. A. malayana, *Wall. Cat.* 6282. Bertiera javanica and fasciculata, *Blume Bijd.* 987; *DC. Prodr.* iv. 392. Mycetia javanica, *Reinw.* Rondeletia longifolia, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 137; *Don Prodr.* 138. Wendlandia longifolia, *DC. l. c.* 412. W. malayana, *G. Don Gen. Syst.* iii. 519.

SUBTROPICAL HIMALAYA and mountains of Eastern Bengal from KUMAON, alt. 4000 ft., to SIKKIM, alt. 2–5000 ft.; KHASIA MTS., alt. 0–5000 ft.; ASSAM, CACHAR, CHITTAGONG, MUNNIPORE, TENASSERIM, MALACCA, and PENANG.

A bush with very brittle branches, covered with smooth yellowish shining spongy bark. *Leaves* 4–10 in., very variable in width, narrowed into the slender petiole ½–2½ in. long, above glabrous puberulous pubescent or with small scattered hairs, beneath always more pubescent or tomentose than above; stipules oblong-lanceolate entire or 2-fid, glabrous hairy or with marginal glands. *Cymes* often 6–8 in. across, 3-chotomously branched, glabrous or pubescent; branches very slender, zig-zag; bracts and bracteoles small, glandular; flowers pedicelled, solitary or fascicled. *Calyx-tube* ⅛ in., hemispheric or subglobose; teeth about as long, ovate subulate or lanceolate and sinus glandular, persistent. *Corolla* fleshy, ¼–¾ in., glabrous or pubescent, tubular, yellow; lobes small, broadly ovate. *Berries* ¼ in. diam., always white.—Flowers (as observed by Wallich and C. B. Clarke) di- or tri-morphous; one form has short styles and stamens inserted over the ring of hairs above the middle of the tube; in another the style is long, and the stamens basal inserted below the ring of hairs; the third has a short wide corolla with the stamens about its middle. In diseased specimens the bracts and calyx-teeth become very hard short broad and toothed, reflexed, white like the bark, and shining.

2. **A. stipulata,** *Hook. f.*; leaves elliptic or elliptic-lanceolate, acuminate, nerves puberulous beneath, stipules very large foliaceous, cymes terminal with their peduncles pubescent shorter than the leaves, bracts linear, flowers shortly pedicelled corymbose.

E. NIPAL and SIKKIM, alt. 2–5000 ft. in very wet places, *J. D. H.*, *C. B. Clarke*, &c.

A lax rooting shrub, bark green opaque. *Leaves* 7–10 in., black when dry; petiole 1½–3 in.; stipules ¾–1 in. diam., orbicular, obtuse, glabrous. *Flowers* in rounded corymbs at the ends of the horizontal cyme-branches. *Calyx-tube* hemispheric, teeth oblong-ovate recurved. *Corolla* in the only flowers seen shorter than the calyx-teeth, with lanceolate lobes and exserted stamens. *Berries* 2-celled, white.

3. **A. macrostachya,** *Hook. f.*; leaves elliptic-lanceolate acuminate quite glabrous on both surfaces, stipules very large foliaceous, cymes terminal with their peduncles glabrous very slender longer than the leaves, bracts ovate, flowers on slender pedicels lax.

MISHMI hills, in Upper Assam, *Griffith.*

Very similar to *A. stipulata*, but the leaves, which are a foot long, are quite glabrous, the glabrous cyme far more slender, a foot long, with a peduncle 8 in. long and very distant slender branches 3–5 in. long, bearing loose 3-chotomous peduncles with slender pedicels; the bracts, too, are short and broad.

** *Berry 5–6-celled.*

4. **A. Lawii,** *Hook. f.*; leaves elliptic-lanceolate acuminate puberulous beneath, stipules small oblong-lanceolate, cymes terminal and axillary sessile or shortly peduncled pubescent, branches divaricating. Lawia acuminata, *Wight Ic.* t. 1070, and in *Calc. Journ. Nat. Hist.* vii. 15.

Mountains of the CARNATIC and TRAVANCORE, *Law, Wight,* &c.

So similar to *A. longifolia* that I doubt its being other than a form of that plant, with a 5–6-celled ovary. The corolla in the only flowers seen is very shortly tubular, shorter than the subulate-lanceolate calyx-teeth and basal stamens; no doubt there are other forms (as in the case of *A. longifolia*).

36. MYRIONEURON, *Wall.*

Small shrubs with stout branches and spongy bark. *Leaves* and stipules large. *Flowers* white, in large peduncled terminal rarely axillary capitate or corymbose cymes; bracts rigid, lanceolate. *Calyx-tube* ovoid; lobes 5, lanceolate, exceeding the corolla, rigid, persistent. *Corolla* small, tubular, throat villous; lobes short, erect, hispid, valvate in bud. *Stamens* 5, in the tube of the corolla, filaments short, subulate; anthers linear, included. *Ovary* 2-celled; style short, stigmas 2 linear-oblong coherent; ovules very numerous, on hemispheric placentas. *Berry* ovoid, white, dry or fleshy, with 2 many-seeded cells. *Seeds* minute, angled, testa pitted; embryo minute in fleshy albumen.—DISTRIB. Species 6 or 8, in India beyond the Ganges and Borneo.

1. **M. nutans,** *Wall. Cat.* 6225; leaves broadly elliptic or obovate abruptly acuminate, nerves 15–20 pair nearly horizontal, heads terminal and axillary shortly peduncled dense-flowered, calyx-teeth subulate-lanceolate rigid. *Kurz For. Fl.* ii. 55.

ASSAM, *Hamilton*; KHASIA MTS., alt. 0–3000 ft., *De Silva,* &c.; CHITTAGONG HILLS, *C. B. Clarke.*

A small erect shrub, 2–3 ft.; branches very stout, woody, with thick pale spongy bark. *Leaves* 5–10 by 3½–5½ in., coriaceous, green when dry, nerves often pubescent beneath; petiole ½–¾ in.; stipules ½–¾ in., triangular-lanceolate. *Heads* 1–1½ in. diam., usually globose, rarely loose with the peduncles exposed, glabrous or pubescent; bracteoles and calyx-teeth ⅓ in., subulate, rigid, persistent, longer than the tubular corolla, which has short obtuse lobes pubescent on the back. *Fruit* dry.

VAR. *parviflora*; flowers corymbose smaller.—Birma, *Griffith.*

2. **M. Clarkei,** *Hook. f.*; leaves elliptic-lanceolate acuminate, nerves 12–15 pair slender very obliquely arched, peduncles simple or branched, calyx-teeth filiform.

CHITTAGONG, *J. D. H. & T. T.*, *C. B. Clarke.*

Very near *M. nutans*, if not a variety of it; the leaves are much narrower, and longer petioled with fewer and much less prominent obliquely arching nerves, and the bracteoles and calyx-teeth are much more slender and not rigid.

3. **M. angustifolium,** *Hook. f.*; leaves narrowly elliptic-lanceolate acute, nerves 12–15 pair slender very obliquely arched, bracteoles and calyx-teeth subulate-lanceolate rigid.

BIRMA; hills west of the Hookhoom valley, *Griffith.*

This again is very near *M. nutans*, differing in the form of its leaves and their nervation, but agreeing in the bracteoles and calyx-teeth.

37. AULACODISCUS, *Hook. f.*

A small glabrous tree, branches thick. *Leaves* coriaceous; stipules triangular, long-acuminate. *Flowers* small, polygamous, in short axillary panicled peduncled cymes, ebracteate. *Calyx-tube* broadly hemispheric; limb short, truncate. *Corolla* coriaceous, rotate, 8–16-partite, throat hairy; segments triangular, valvate in bud with incurved tips, margins webbed. *Stamens* 8 or 16, alternate ones irregularly imperfect, filaments flexuous; anthers minute, didymous. *Disk* large, prominent, 8–16-lobed, lobes opposite the petals with hooked tips. *Ovary* 6–16-celled; style very short, thick, stigma large peltate fleshy, 6–16-lobed; ovules numerous, on prominent placentas in the inner angles of the cells. *Berry* small, globose, areolate, usually 8- (6–16-) celled, many-seeded. *Seeds* minute, subglobose, testa thick crustaceous pitted; embryo pyriform, in fleshy and oily albumen.

1. **A. premnoides,** *Hook. f. in Gen. Pl.* ii. 71. Axanthes enneandra, *Wight in Calc. Journ. Nat. Hist.* vii. 144.

MALAY PENINSULA, from Tenasserim or the Andaman Islands, *Helfer* (Kew Distrib. 2938), to MALACCA, *Griffith, Maingay* (Kew Distrib. 938).

Branches stout, obtusely 4-angled. *Leaves* 5–9 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., linear-oblong, acute, pale brown when dry, nerves numerous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* 1–$1\frac{1}{2}$ in. diam., corymbose, trichotomous, pubescent; peduncles $\frac{1}{2}$–1 in., suberect; bracts leafy. *Flowers* $\frac{1}{10}$ in. diam. *Berry* $\frac{1}{4}$ in. diam., globose.

38. UROPHYLLUM, *Wall.*

Trees or bushes with slender terete branches. *Flowers* (sometimes unisexual) small, in axillary sessile or peduncled heads cymes or corymbs, pedicels short bracteolate at the base. *Calyx-tube* short; limb cup-shaped, 5- (4–7-) toothed, persistent. *Corolla* coriaceous, tube short, throat villous; lobes 5 (4–7) triangular, valvate in bud. *Stamens* 5 (4–7) on the throat of the corolla, filaments short; anthers linear, acute. *Ovary* 5- (4–7-) celled; style short, often swollen at the base, stigma various; ovules numerous, placentas attached to the inner angles of the cells. *Berry* small, 4–5-celled, many-seeded. *Seeds* minute, subglobose, testa crustaceous pitted; embryo clavate, in fleshy albumen. —DISTRIB. Species about 35, tropical Asiatic and African, and 1 Japanese.

* *Branches and leaves beneath glabrous.* (See also Sp. 6, 7, and 8.)

1. **U. ellipticum,** *Thw. Enum.* 419; quite glabrous, leaves 6–9 in. oblong-lanceolate acuminate, stipules long, cymes sessile dense-fld., flowers unisexual glabrous without, petals bearded within. Axanthes elliptica, *Wight in Calc. Journ. Nat. Hist.* vii. 147, t. 2, f. 3; *Ic.* t. 1164; *Thw. l. c.* 139.

CEYLON; central province, alt. 4–7000 ft., *Wight*, *Walker*, &c.

A tree? (Wight). *Branches* terete, puberulous upwards. *Leaves* rather coriaceous, narrowed at both ends; petiole $\frac{1}{3}$–1 in., and midrib above with a few short appressed hairs; stipules $\frac{3}{4}$ in., rigid, erect, narrowly lanceolate, coriaceous. *Cymes* $\frac{1}{3}$ in. diam. *Flowers* very shortly pedicelled, black when dry. $\frac{1}{4}$ in., dull orange (Thwaites l. c. 139), white (Ic. 419). *Berries* orange.

2. **U. zeylanicum,** *Thw. Enum.* 418; quite glabrous, leaves 3–5 in. ovate or elliptic-lanceolate obtusely acuminate, stipules short, cymes peduncled umbellate, flowers unisexual. Axanthes ceylanica, *Wight in Calc. Journ. Nat. Hist.* vii. 146, t. 2, f. 2; *Ic.* t. 1163; *Bedd. Fl. Sylv. Anal. Gen.* xvi. f. 2.

CEYLON; central province, alt. 4–7000 ft., *Wight*, *Walker*, &c.

Branches terete, more slender than in *U. elliptica*. *Leaves* coriaceous, narrowed at both ends; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules triangular. *Cymes* solitary or in pairs; peduncle shorter than the petiole; pedicels $\frac{1}{6}$ in. *Flowers* about $\frac{1}{6}$ in. diam., sometimes puberulous. *Berries* orange-yellow.

3. **U. Griffithianum,** *Wight in Calc. Journ. Nat. Hist.* vii. 147 (Axanthes); leaves 6–9 in. glabrous elliptic or obovate-oblong abruptly caudate-acuminate, stipules $\frac{2}{3}$ in. lanceolate from a broad base, cymes umbellate, corolla-lobes acute. Urophyllum sp., *Wall. Cat.* 8322.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2945, 2946), *Maingay* (881).

Branches rather slender. *Leaves* shortly petioled; stipules $\frac{1}{2}$ in., coriaceous, erect, lanceolate from a broad base. *Cymes* solitary or in pairs from each axil; peduncle longer or shorter than the petiole, and pedicels and calyx usually minutely warted and puberulous; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. *Flowers* $\frac{1}{6}$ in. diam.; corolla-lobes glabrous, triangular, acute, membranous. Griffith's No. 2945 has large leaves rounded at the base, longer petioles, and very broad ovate-oblong stipules.

4. **U. glabrum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 186; *Cat.* 8316, *excl.* B.; glabrous, leaves elliptic-oblong or lanceolate or linear or obovate-lanceolate caudate-acuminate, stipules very narrow linear silky, cymes glabrous or hoary sessile or peduncled and umbellate, calyx-lobes obtuse. *DC. Prodr.* iv. 441; *Kurz For. Fl.* ii. 53. Urophyllum, *Wall. Cat.* 8318, 8319. U. arboreum, *Korth. in Ned. Kruidk. Arch.* ii. 194. U. repandulum, *Miq. Fl. Ind. Bat.* ii. 353. Axanthes arborea, *Blume Bijd.* 1003. Wallichia arborea, *Reinw. ex Blume in Flora*, 1825, 107.

SOUTH TENASSERIM, *Kurz*, *Helfer*. SINGAPORE, PENANG, and MALACCA, *Wallich*, *Maingay*, &c. (Kew Distrib. 883).—DISTRIB. Java, Borneo.

Very near indeed to *U. Griffithianum*, and probably not specifically distinct, but the stipules are always very narrow, the leaves (which vary greatly in shape and from 3–10 in. in length) have more regular transverse veins, and the corolla-lobes appear to be obtuse. The leaves are either gradually or abruptly narrowed into narrow ligulate points sometimes nearly 1 in. long; the cyme, peduncles and pedicels are sometimes pubescent, and the flowers vary much in size; hence more than one species may be confounded under the above synonyms and numbers. Helfer's Tenasserim plant has longer petioles, sessile cymes, and a hairy midrib beneath; it more resembles *Griffithianum*, but has very narrow stipules.

** *Branches more or less hairy (sometimes glabrate in sp.* 6, 7, *and* 8).

5. **U. hirsutum,** *Wight in Calc. Journ. Nat. Hist.* vii. 148 (Axanthes); branches densely tomentose, leaves subsessile ovate- or oblong-lanceolate caudate-acuminate pubescent beneath, stipules $\frac{1}{2}$–1 in. linear-lanceolate, cymes small sessile capitate, calyx and corolla tomentose. Wendlandia? bifaria, *Wall. Cat.* 6278.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2939), *Maingay* (873).

Branches slender, and stipules, petioles, leaf-nerves beneath and cymes with

spreading pubescence. *Leaves* 3–4 in., glabrous or pubescent above, base rounded or cordate; stipules slender, gradually tapering from the base upwards. *Cymes* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; flowers small, subsessile, $\frac{1}{8}$ in. diam. *Berries* pedicelled, pubescent.—Wallich's *Urophyllum*, 8315, from Singapore, resembles this, but has much larger leaves, 6–8 in., narrowed at the base, petioles $\frac{1}{4}$ in., and shortly peduncled cymes with glabrous fruit. The specimens are very imperfect.

6. **U. longifolium,** *Wight in Calc. Journ. Nat. Hist.* vii. 145, t. 2, f. 1; *Ic.* t. 1165 (Axanthes); young branches villous or glabrate, leaves large petioled membranous elliptic-lanceolate acuminate, nerves beneath and lanceolate stipules tomentose, cymes sessile with the peduncles and pedicels tomentose, flowers glabrous. U. strigosum, *Kurz For. Fl.* ii. 53, *not of Korthals.*

TENASSERIM, *Helfer* (Kew Distrib. 2940); Mergui, *Griffith, Kurz.*

Branches slender, obtusely 4-angled, the last internode usually villous. *Leaves* 6–10 in., hardly caudate at the tip, base acute or rounded, midrib above pubescent, beneath tomentose, as are the petiole and stipules. *Bracts* conspicuous though small. —Kurz refers this (Journ. As. Soc. Beng 1877, ii. 161) to *U. glabrum*, which differs in the glabrous cyme and leaves, and in the Forest Flora to Blume's *Axanthes strigosa*, a Javanese mountain plant, described by its author and by Miquel as having silky strigose branches, cymes, and nerves beneath, acute calyx-teeth and subcoriaceous leaves, characters wholly different from those of *U. longifolium*. The Tenasserim form of *U. glabrum* almost unites that variable species with this.

7. **U. streptopodium,** *Wall. Cat.* 8317, *partly*; branches petioles nerves beneath stipules and cymes thinly appressed-hairy, leaves petioled elliptic-oblong or lanceolate, stipules linear-lanceolate, cymes sessile, male calyx truncate, female 5-toothed, corolla glabrous tubular cleft at the top, style elongate. U. parviflorum, *Wall. Cat.* 8320. Geniostoma acuminatum, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 316; *Cat.* 9067. Urophyllum, *Wall. Cat.* 8316, *in part,* and 8316 B.

MALACCA and PENANG, *Wallich, Griffith* (Kew Distrib. 2941, 2942), *Maingay* (882).

Whole plant pale blue when dry, and best distinguished by the appressed white hairs on the branches, narrow stipules, toothed female calyx, and form of the corolla; but I find great difference in the size of the corolla, which is sometimes cleft at the top only, and at others much lower down.—*Wallich's* 8316 B., from "Herb. Finlayson" (from Siam, I suppose), has very fine points to the leaves, and large flowers; his 8320 (*U. parviflorum*) has slender branches, small narrow leaves and stipules, and minute imperfect flowers; it may be a different species.

8. **U. Blumeanum,** *Wight in Calc. Journ. Nat. Hist.* iv. 145 (Axanthes); branches slender slightly hairy, leaves petioled elliptic-lanceolate or oblanceolate caudate-acuminate, petioles and cyme-branches and linear-lanceolate stipules silkily-pubescent, cymes peduncled subumbellate simple or branched lax-flowered, female calyx truncate, corolla glabrous. Timonius? acuminatus, *Wall. Cat.* 6218. U. streptopodium, *Wall. Cat.* 8317, *in part,* and U. glabrum, 8316, *in part,* and ? 8315.

PENANG, *Porter, Wallich*; MALACCA, *Griffith* (Kew Distrib. 2943); SINGAPORE, *Wallich, Lobb.*

Very closely allied to *U. streptopodium*, differing in the less silkily hairy branches, peduncled more pubescent cymes with looser flowers, and apparently always truncate male calyx, though of this I am not quite sure.—Wallich describes the calyx as "hairy without," which I do not find to be the case. The contents of the sheet to which the ticket *U. glabrum* of Wallich's 8317 is attached, are four specimens of this and one of a non-rubiaceous plant. Wallich's 8315 may be a large state of this, but it is far more robust and in an imperfect state.

9. **U. villosum,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 185; *Cat.* 8314; branches very stout petioles cymes and nerves beneath densely tomen-

tose, leaves very large ovate-lanceolate or linear-oblong coriaceous caudate-acuminate, stipules linear-lanceolate, cymes sessile or peduncled capitate and flowers densely tomentose. *DC. Prodr.* iv. 441.

PENANG, *Wallich, Maingay* (Kew Distrib. 884); SINGAPORE, *Lobb.*

Branches as thick as the little finger, cylindric. *Leaves* 6–12 by 2–4 in., tail very slender 1–1½ in., pubescent, especially on the nerves beneath, green when dry. *Cymes* ½–1 in. diam.; bracts often exceeding the flowers, which are the largest of the genus; peduncle, if present, very stout. *Berry* ¼ in. diam., pubescent, crowned with the calyx-teeth.

39. SCHIZOSTIGMA, *Arn.*

A creeping hirsute herb. *Leaves* membranous; stipules broadly ovate, acute. *Flowers* 1–3 together, subsessile, axillary with 2 stipular bracts. *Calyx-tube* obovoid: limb produced, throat hirsute; lobes 5, lanceolate, unequal, persistent. *Corolla* funnel-shaped, throat pubescent; lobes 5, ovate-lanceolate, valvate in bud with incurved tips. *Stamens* 5, in the throat of the corolla, filaments short; anthers linear, half exserted. *Ovary* 5–7-celled; style filiform, stigmas 5–7 linear; ovules crowded on placentas in the inner angles of the cells. *Berries* ovoid, 5–7-celled, many-seeded. *Seeds* minute, ovoid, testa mucilaginous; embryo clavate, in fleshy oily albumen.

1. **S. hirsutum,** *Arn. in Ann. Nat. Hist.* iii. 20; *Thw. Enum.* 139; *Bedd. Ic. Pl. Ind. Or.* t. 95. Rubiacea, *Wall. Cat.* 8463.

CEYLON; southern districts, ascending to 2000 ft., *Walker*, &c.

Stem flexuous, extensively creeping and rooting, sending up short erect leafy branches 4–8 in. high. *Leaves* 1½–2½ in., pale brown when dry, elliptic, acute, hirsute on both surfaces, nerves slender; petiole ¼–½ in.; stipules ⅓ in. *Flowers* white, ⅔ in. diam. *Berries* the size of a small cherry.—Wallich's specimens are marked as from Hb. Finlayson, but as Finlayson collected only in Siam and the Malay Peninsula (so far as is known) there is no doubt some error.

40. LECANANTHUS, *Jack.*

A rooting small glabrous shrub, branches acutely 4-angled. *Leaves* petioled stipules large. *Flowers* reddish, crowded in axillary sessile or peduncled nodding involucrate heads. *Calyx-tube* ovoid or turbinate; limb obliquely campanulate, unequally obtusely 2–4-lobed or 2-lipped, persistent. *Corolla* funnel-shaped; tube inflated at the base; lobes 5, thick, obtuse, bearded at the tip, valvate in bud. *Stamens* 5, on the throat of the corolla, filaments short; anthers 2-lobed. *Disk* urn-shaped. *Ovary* 2-celled; style filiform, stigmas 2 linear or oblong; ovules numerous on spongy placentas attached to the septum. *Fruit* membranous, 2-celled, mucilaginous within, many-seeded, placentas thick. *Seeds* obtusely angled, testa thick smooth; embryo small in fleshy albumen.

1. **L. erubescens,** *Jack in Mal. Misc.* ii. 84; *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 319; *Cat.* 6224; *DC. Prodr.* iv. 620. Lecananthus sp., *Griff. Notul.* iv. 272.

SINGAPORE, *Wallich, Lobb*; MALACCA, *Griffith* (Kew Distrib. 2784), *Maingay* (912).—DISTRIB. Sumatra, Borneo.

Stem a foot high, stout, brown when dry. *Leaves* 3–6 by 1–2 in., elliptic elliptic-ovate or linear-oblong, acuminate, opaque, nerves faint; petiole short; stipules ½ in., ovate-lanceolate, acuminate. *Heads* ¾–1 in. diam.; the foliaceous calyces imbricating; peduncle 0 or short, glabrous or puberulous; involucre small, lobed. *Calyx* purplish, limb enlarged in fruit. *Corolla* pink.—I know of but one species of this genus.

41. KEENANIA, *Hook. f.*

A low subherbaceous shrub; stem woody, flexuous, cylindric. *Leaves* opposite, elongate-oblanceolate, abruptly acuminate, narrowed into the petiole, membranous; stipules long, interpetiolar, subulate from an ovate-lanceolate base. *Flowers* sessile, in dense bracteate terminal solitary subsessile involucrate heads, mixed with coriaceous imbricating concave bracts; outer bracts orbicular, inner oblong or spathulate, concave; bracteoles 2, spathulate, coriaceous, equalling the flowers. *Calyx-tube* fleshy, shortly oblong; limb of 5 rarely 6 large oblong or spathulate, coriaceous, obtuse or acute, unequal, erect, concave, imbricating lobes. *Corolla* about equalling the calyx-lobes; tube inflated, glabrous; lobes 5, short, orbicular-ovate, apiculate, papillose externally, valvate in bud; throat with a ring of stiff hairs. *Stamens* 5, epigynous, seated at the base of the broad-lobed disk; filaments short; anthers small, linear, obtuse, without pollen. *Ovary* 2-celled; style short, stigmas 2 flat ovate acute; ovules very numerous, crowded on globose placentas adnate to the membranous septum.

1. K. modesta, *Hook. f.*

CACHAR; at the Doarband Pass, *R. L. Keenan.*

Stem as thick as a goose-quill, apparently inclined or prostrate, puberulous above, as are the petioles. *Leaves* 6–12 by $1\frac{1}{2}$–3 in., membranous, green when dry, midrib slender, and 15–20 pair of almost horizontal slightly arched nerves, puberulous beneath; petiole $\frac{3}{4}$–1 in.; stipules $\frac{1}{2}$–1 in., somewhat recurved. *Heads* nodding, globose, 1 in. diam.; bracts and bracteoles green. *Flowers* probably unisexual, those of the specimens ♀. *Calyx* $\frac{1}{3}$ in. long, the lobes much longer than the tube.—A very distinct genus, allied to *Lecananthus*, but differing widely in the calyx and terminal inflorescence. The distinctly epigynous stamens (evidently those of a ♀ plant) resemble those of one form of *Adenosacme*. I have named it after Mr. Keenan, once an employé of Kew, who formed an excellent collection of Cachar plants in 1874, which he presented to the Herbarium of the Royal Gardens.

TRIBE VI. GARDENIEÆ.

42. WEBERA, *Schreb.*

Trees or shrubs. *Leaves* opposite, petioled; stipules triangular-ovate, usually deciduous. *Flowers* in terminal corymbiform cymes, sessile and 2-bracteoled at the ovary, or pedicelled and bracteolate on the pedicel. *Calyx-tube* ovoid or turbinate; limb short or long, 5- very rarely 4-fid or -partite. *Corolla* funnel- or salver-shaped, tube short or long, throat glabrous or pubescent; lobes 5, rarely 4, narrow, rarely short, spreading or reflexed, twisted in bud. *Stamens* 5, rarely 4, on the corolla-mouth; filaments short or 0; anthers slender, exserted. *Ovary* 2-celled; style stout, usually pubescent; stigma long and spindle-shaped, grooved, usually far exserted; ovules numerous, rarely few or 2 or solitary in each cell, often immersed in fleshy peltate placentas. *Berry* small, globose, 2-celled, cells 1–many-seeded. *Seeds* plano-convex or cupped, rarely angled; testa various, albumen fleshy or horny; embryo small, cotyledons leafy, radicle pointing variously.—DISTRIB. About 40 species, tropical Asiatic.

As here defined *Webera* includes the 5-merous-flowered plants with 1-ovuled ovarian cells which have been hitherto referred to *Ixora* and *Pavetta*, from which they further differ in their short pubescent styles and stout fusiform grooved stigma.

SECT. I. **Euwebera.** *Ovules* 2 or more in each cell.

* *Corolla-tube equalling or shorter than the lobes.*

1. **W. corymbosa,** *Willd.*; *Roxb. Fl. Ind.* i. 696; glabrous, leaves elliptic- or oblong-lanceolate acute or acuminate, corolla glabrous externally, tube broad about equalling the lobes, berries few-seeded. *Gaertn. Fruct.* t. 192; *Bot. Reg.* t. 119. W. asiatica, *Bedd. Fl. Sylv.*, *Anal. Gen.* xvi. f. 2; *Kurz For. Fl.* ii. 47. W. glomeriflora, *Kurz l. c.* W. cerifera, *Moon Cat.* 19. Rondeletia asiatica, *Linn.* Canthium corymbosum, *Pers. Synops.* i. 200. Cupea corymbosa, *DC. Prodr.* iv. 394. Stylocoryne sp., *Wall. Cat.* 8408. S. Webera, *A. Rich.*; *W. & A. Prodr.* 401; *Wall. Cat.* 8401, *excl.* A. *in part*, B.C.E.F.G.H.; *Thw. Enum.* 148; *Wt. Ic.* t. 309, 584; *Dalz. & Gibs. Bomb. Fl.* 119. S. rigida, *Wt. Ic.* t. 1064. Polyozus? madraspatana, *DC. l. c.* 495. Pavetta Wightiana, *Wall. Cat.* 6167.—*Rheede Hort. Mal.* ii. t. 23.

WESTERN PENINSULA, from the Concan southwards, and CEYLON, common.—DISTRIB. Malay Islands.

A large shrub or small tree, glabrous except the cymes sometimes, almost olive-black or brown when dry. *Leaves* 3–8 by $\frac{3}{4}$–3 in., coriaceous, shining above, often glaucous beneath; petiole short, stout; stipules very coriaceous, acute or mucronate, often sheathing. *Cymes* and *flowers* very variable in size, faintly odorous. *Calyx* glabrous or pubescent; limb shortly or deeply lobed, lobes glabrous or ciliate. *Corolla* $\frac{1}{3}$–$\frac{3}{4}$ in. diam., lobes glabrous or puberulous within, white. *Style* hairy or glabrous. *Berries* size of a pea, with the calyx-limb persistent or not.—A very variable plant. Var. *cerifera* of Thwaites, from Ceylon is remarkable for its very coriaceous leaves, and the copiously resinous secretion at the nodes, &c.; a character, however, of usual occurrence, according to Roxburgh. *S. rigida*, Wt., is a robust small-leaved form.

2. **W. odorata,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 699; leaves elliptic-lanceolate acuminate glabrous, cymes many-fld. pubescent, flowers pedicelled, corolla-tube slender pubescent shorter than the linear lobes. W. macrophylla, *Roxb. l. c.* 697. Pavetta weberæfolia, *Br. in Wall. Cat.* 6182 A., *in part.* P. cerberæfolia (by error), *Miq. Fl. Ind. Bat.* ii. 279. Stylocoryne Webera, *Wall. Cat.* 8401 K. S. penangensis, *Miq. l. c.* 207. Cupia macrophylla, *DC. Prodr.* iv. 394.

SILHET, ASSAM, and the KHASIA MTS., *De Silva*, *Griffith*, &c. (Kew Distrib. 3009). MUNEYPOOR, *C. B. Clarke.* PENANG, *Roxburgh*, *Wallich.*

A shrub, black when dry. *Leaves* 5–9 by 2–3 in., membranous; petiole short; stipules acute, deciduous. *Cymes* large, corymbose; bracts linear; pedicels slender. *Calyx* minutely toothed. *Corolla-tube* $\frac{1}{4}$ in., lobes nearly twice as long. *Ovules* few. *Berries* "size of a pea" (Roxb.).—I find no difference between the flowering specimens from Bengal and Penang, but have seen fruits of neither. Roxburgh describes the berry of the Penang plant (*macrophylla*) as "many-seeded, as in *W. corymbosa*," that of the Silhet one (*odorata*) as having only 3–4 ovules in each cell. This differs from *corymbosa* in the slender pubescent corolla-tube and the bracts.

3. **W. disperma,** *Hook. f.*; leaves elliptic- or linear-lanceolate acuminate glabrous, cymes pubescent many-flowered, corolla-tube broad pubescent shorter than the lobes, berries 2-seeded.

SILHET and the KHASIA MTS., *Griffith* (Kew Distrib. 2786); alt. 1–4000 ft., *J. D. H. & T. T.*

A shrub. *Leaves* olive-brown when dry, 4–10 by $1\frac{1}{2}$–3 in., very variable in width; petiole $\frac{1}{2}$–$\frac{2}{3}$ in.; stipules triangular-lanceolate. *Cymes* shortly peduncled, more robust shorter and fewer-flowered than in *W. odorata*; calyx larger obtusely-toothed. *Corolla* similar, but with a broader tube. *Ovary* with 2 ovules in each cell (rarely more), sunk collaterally in a large spongy placenta. *Berries* very much larger, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., with one hemispheric seed in each.—A Bornean species (Beccari. 380) resembles this closely in foliage and flowers, but I have not seen its fruit.

4. **W. pumila,** *Hook. f.*; dwarf, leaves small rigid lanceolate glabrous apiculate, corymbs small subcapitate hirsute, corolla glabrous externally, tube equalling the limb, berries several-seeded.

KHASIA MTS.; Borpane river, alt. 1–1500 ft., *Simons, Lobb, J. D. H. & T. T.*

A rounded erect shrub, a foot or two high, with very woody short crowded branches. *Leaves* 1½–2 in., subsessile, pale brown when dry, margin recurved; petiole and triangular stipules pubescent. *Cymes* ½–1 in. diam., hirsute. *Calyx-teeth* minute. *Ovary-cells* 3–4-ovuled. *Corolla* white, tube and lobes about ¼ in. long. *Berries* size of a small pea, shortly pedicelled, crowned by the calyx-limb. *Seeds* angled.—Quite unlike its congeners in its dwarf size, pale brown colour when dry, and the contracted corymbs.

** *Corolla-tube longer than the lobes.*

5. **W. monosperma,** *W. & A. Prodr.* 401 (Stylocoryne); glabrous, leaves oblanceolate acuminate, corolla glabrous externally, tube much longer than the lobes, berry 1-seeded. *Wt. Ic.* t. 317.

TRAVANCORE; at Courtallam, *Wight.*

A shrub, olive-brown when dry, branches rather slender. *Leaves* 4–9 by 1–2½ in., rather thin, narrowed into the short petiole; stipules triangular. *Cymes* many-flowered, corymbose, glabrous. *Calyx-teeth* minute. *Corolla-tube* ⅔ in., lobes ⅓ in. *Ovary-cells* 2–3-ovuled. *Berries* "white, size of a small cherry" (Wt.).

6. **W. fragrans,** *Blume Bijd.* 982 (Stylocoryne); branches and leaves glabrous, leaves elliptic or elliptic-lanceolate acute, cymes pubescent open many-flowered, corolla-tube very long slender much longer than the lobes, berries many-seeded. Stylocoryne fragrans, *DC. Prodr.* iv. 377. S. laxiflora, *Blume Bijd.* 983; *DC. l. c.* S. lucida, *Miq. Fl. Ind. Bat. Suppl.* 541. Rondeletia lucida, *Wall. Cat.* 8453. Ceriscus fragrans, *Nees in Flora*, 1825, 116. Wahlenbergia fragrans, *Blume Cat. Hort. Buit.* 13.

MALACCA and SINGAPORE, *Wallich*, &c., *Maingay* (Kew Distrib. 893).—DISTRIB. Banca, Java, Borneo.

A small tree, "sometimes 60 ft." (Hasskarl), branches 4-angled. *Leaves* pale brown, 4–6 in., narrowed into the petiole, rather shining above, nerves beneath sometimes puberulous; stipules triangular. *Cymes* 3–4 in. diam.; pedicels slender, bracts linear. *Calyx-teeth* triangular. *Corolla-tube* 1 in., 5 times as long as the linear-oblong lobes. *Berries* size of a pea. *Seeds* angular.

7. **W. costata,** *Miq. Fl. Ind. Bat.* ii. 203 (Stylocoryne); leaves obovate obtuse or subacute glabrous or with midrib beneath and nerve-axils pubescent, cymes many and dense-flowered densely pubescent, corolla-tube slender pubescent much longer than the short lobes.

MALACCA, *Griffith* (Kew Distrib. 2791), *Maingay* (915).—DISTRIB. Sumatra, Banca.

A large tree, branches woody, branchlets tomentose. *Leaves* 6–9 by 2½–4½ in., dark brown when dry, coriaceous, narrowed into the short petiole. *Cymes* shortly peduncled, 1½–2 in. diam., bracts minute. *Calyx-lobes* very short, limb deciduous. *Corolla-tube* ⅔ in.; lobes ⅓ the length of the tube, oblong. *Berries* size of a pea, many-seeded.—I have seen only imperfect fruiting specimens of Miquel's *W. costata*, which agree perfectly with this.

8. **W. Maingayi,** *Hook. f.*; branches leaves beneath and cymes tomentose, leaves ovate caudate-acuminate glabrous above, cymes subcapitate, corolla-tube slender tomentose much shorter than the lobes, berries many-seeded.

MALACCA; Mount Ophir, *Griffith* (Kew Distrib. 3081), *Maingay* (932).

A shrub, branches terete. *Leaves* brown when dry, 3–6 in., coriaceous, base rounded; petiole ¼–½ in.; stipules lanceolate, tomentose. *Cymes* 2–3 in. diam.,

almost hispid; bracts linear. *Calyx-teeth* subulate. *Corolla-tube* ⅓ in.: lobes ⅓ the length of the tube, oblong. *Berries* size of a pea, with persistent calyx-teeth. *Seeds* broadly cuneate, sides smooth, back granulate.—Very near a Bornean species (Beccari, n. 1263).

9. **W. mollis,** *Wall. Cat.* 8454 (Rondeletia?); softly tomentose, leaves elliptic or elliptic-lanceolate or oblanceolate acuminate, cymes open many-flowered with long spreading hairs, calyx-tube slender pubescent much longer than the lobes, berries many-seeded.

SINGAPORE, *Wallich*; PENANG, *Maingay* (Kew Distrib. 894).

A small tree; branches robust, softly tomentose and covered with long spreading hairs, as are the cymes petioles and midrib beneath. *Leaves* either broad, 6–8 by 3–4 in., or narrow 4–5 by 1–2 in., uniformly tomentose above, pale brown when dry; petiole short; stipule large, ovate-lanceolate. *Cymes* subsessile, very many-flowered. *Calyx-teeth* lanceolate, deciduous. *Corolla-tube* ½ in., 4 times as long as the oblong short lobes. *Berries* size of a pea. *Seeds* angular.

SECT. II. **Pseudixora.** Cells of the ovary 1-ovuled.

† *Tube of the corolla shorter than the lobes.*

10. **W. stellulata,** *Hook. f.*: quite glabrous or nearly so, leaves elliptic-lanceolate acuminate, nerves 7–9 pair, petiole slender, cymes small sessile or shortly peduncled, flowers sessile 2-bracteolate, calyx-teeth ovate-lanceolate, corolla-lobes longer than the tube, the minute subulate tips stellately spreading in bud. Stylocoryne Webera, *Wall. Cat.* 840, I. *in part.* ? Pavetta aristata, *Wall. Cat.* 6169.

PENANG, *Wallich, Griffith* (Kew Distrib. 3086); MALACCA, *Maingay* (850); ? TAVOY, *Gomez.*

Branches slender, smooth, and whole plant either black or dirty green when dry. *Leaves* 6–9 by 2–3 in., membranous, shining above, glabrous or puberulous beneath; nerves slender; petiole ¼–1 in.; stipules with a slender cusp. *Cymes* 1–1½ in. diam.; bracts subulate-lanceolate, persistent; branches short and calyx puberulous; flowers ⅓ in. long. *Corolla* with a ring of hairs in the throat; lobes lanceolate, ciliolate. *Style* hirsute; stigma long, fusiform, grooved.—I have not in any specimens (I have examined 7) found the corolla to open; the stellate tips of its lobes are remarkable. A mere scrap is on the sheet 8401 I. of Wallich's Herbarium, but good specimens were distributed by him under that number to both the Hookerian and Benthamian Herbaria. Wallich's specimen of *Pavetta aristata* is probably the same, but I have no other Tenasserim example. The nerves are more numerous, and it has longer cusps to the stipules; it is in young fruit only. Maingay in his notes states that the ovary-cells have several ovules; I find only one in each.

11. **W. attenuata,** *Hook. f.*: quite glabrous, leaves elliptic-lanceolate or oblanceolate acuminate polished above, nerves 5–7 pair very oblique, cymes sessile or shortly peduncled brachiate glabrous lower branches rather long, flowers pedicelled ebracteolate, calyx-teeth short triangular, corolla glabrous, lobes linear longer than the tube, throat pubescent. Stylocoryne attenuata, *Voigt Hort. Suburb. Calcut.* 377. S. Webera, *Wall. Cat.* 8401 F. (*in Herb. Hook. & Benth.*); *Benth. Fl. Hongk.* 156.

Cultivated in the Calcutta Botanic Gardens; no doubt from China or the Khasia Mts.?—DISTRIB. Hongkong.

A shrub or small tree, black when dry. *Leaves* 3–4 by 1–1½ in., coriaceous, narrowed into a petiole ¼–½ in. *Cymes* 1–2 in. high, branches not divaricate except in fruit; bracts and bracteoles on the pedicels small; flowers white, ⅓ in. diam., quite glabrous. *Stigma* fusiform. *Fruit* size of small pea.—There are no specimens of this in Wallich's Herbarium, but good ones were distributed by him to Herbariums

of Hooker and Bentham, under the number 8401 F., and it is unquestionably the Hongkong plant. We have also Calcutta Garden specimens from Griffith (Kew Distrib. 2794) with the name *W. attenuata*. Voigt (Hort. Subub. Calcutta) couples it with *St. coriacea*, giving to both the habitat "(China) Khasia hills," and so many Chinese plants are Khasian that it may well be found there.

12. **W. longifolia,** *Hook. f.*; branches petioles leaves beneath and cymes softly-tomentose, leaves petioled elongate elliptic-lanceolate or oblanceolate caudate-acuminate membranous, nerves 16–30 pairs, peduncles long slender, flowers pedicelled, corolla pubescent. Ixora longifolia, *G. Don Gen. Syst.* iii. 573; ? *Kurz For. Fl.* ii. 17. I. macrophylla, *Br. in Wall. Cat.* 6165, *not of Bartl.* Pavetta longifolia, *Miq. Fl. Ind. Bat.* ii. 275.

PENANG, *Wallich, Phillips.*

Branches slender. *Leaves* 10–12 by 2–3 in., membranous, glossy above, brown when dry, narrowed into the 1–1½ in. petiole, nerves very slender; stipules short, broad. *Peduncle* very slender, 4–6 in., brachiate at the top; bracts ¼ in., filiform. *Flowers* shortly pedicelled. *Calyx-teeth* subulate-lanceolate, as long as the tube. *Corolla* not seen. *Ovules* 1 in each cell.

13. **W. grandifolia,** *Hook. f.*; leaves elliptic or obovate-lanceolate caudate-acuminate glabrous, nerves 12–15 pairs, cymes long-peduncled tomentose, flowers pedicelled pubescent ebracteolate at the base, corolla-tube much shorter than the linear lobes. Ixora grandifolia, *Br. in Wall. Cat.* 6134.

SINGAPORE, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 2795, 2796), *Maingay* 854.

Branches glabrate. *Leaves* 5–12 by 2½–4½ in., membranous, blackish when dry, polished above; petiole ¼–1 in.; stipules triangular, acuminate. *Cymes* brachiate, long peduncled, or with long deflexed branches; lowest bracts foliaceous, upper filiform. *Flower-buds* ½ in. *Calyx-teeth* rounded, shorter than the tube. *Corolla-tube* short, nearly glabrous within. *Ovules* 1 in each cell.

14. **W. Wallichii,** *Hook. f.*; glabrous, leaves long-petioled elliptic-lanceolate caudate-acuminate, nerves 12–15 pairs, cymes sessile glabrous lower branches long suberect, flowers 2-bracteolate at the base sessile, calyx-teeth triangular acute, corolla glabrous, lobes linear-oblong much longer than the short tube, throat woolly, seeds plano-convex. Stylocoryne Webera, *Wall. Cat.* 8401 I., *for the most part.* Pavetta weberæfolia, *Wall. Cat.* 6182 A., *in part*, B.

PENANG, *Wallich*; MALACCA, *Griffith* (Kew Distrib. 3004, 3084), *Maingay* (851).—DISTRIB. Borneo.

A bush; branches slender, and leaves black when dry. *Leaves* 5–7 by 1½–2 in., membranous, usually shining above; petiole slender, ½–1 in.; stipules triangular, cuspidate. *Cymes* 2–3 in., not brachiate, branches with sometimes a line of pubescence on one side, lower suberect; bracts linear-lanceolate, persistent; bracteoles triangular, acute. *Corolla-tube* ⅙ in.; lobes linear, much longer, margins sometimes ciliate. *Style* villous, stigma narrowly fusiform. *Fruit* size of a pea. *Seeds* plano-convex.—At first sight like *W. odorata*, but the cymes are glabrous, as is the much shorter corolla-tube; the flowers are sessile and 2-bracteolate, and the ovules solitary. A similar plant from the confines of Birma and Assam, collected by Griffith on the Tsegai hills, has shorter very coriaceous leaves, with fewer nerves.

15. **W. Kurzii,** *Hook. f.*; glabrous, leaves petioled elliptic- or obovate-lanceolate acuminate, nerves 8–10 pair, cymes sessile glabrous, flowers pedicelled ebracteolate at the base, calyx-teeth triangular obtuse, corolla glabrous, lobes linear-oblong much longer than the tube, throat woolly, seeds concavo-convex. Ixora weberæfolia, *Kurz in Journ. As. Soc.* 1877, ii. 146; *For. Fl.* ii. 18. Stylocoryne Webera, *Kurz in Andaman Rep.* B. 10.

ANDAMAN and NICOBAR ISLANDS, in the coast forests, *Kurz.*

Very similar to *W. Wallichii*, but differing in the pedicelled ebracteolate flowers, and more obtuse calyx-lobes, and the seeds, which are deeply excavated ventrally.

16. **W. lucens,** *Hook. f.*; quite glabrous, leaves small linear-oblong narrowly elliptic-lanceolate obtuse or acute black and shining when dry, cymes sessile, branches spreading, flowers pedicelled, calyx ebracteolate, teeth short triangular, corolla-tube equalling the linear lobes, throat pubescent. Pavetta sp., *Bedd. Fl. Sylv., For. Man.* 134/8. P.? lucens, *Br. in Wall. Cat.* 6168. Stylocoryne breviflora, *Schlecht. in Herb. Hohen.* No. 1374.

NILGHERRY and TRAVANCORE MOUNTAINS, *Heyne, Wight.*

A bush, very black when dry. *Leaves* 2–4 by $3\frac{1}{4}$–$1\frac{1}{4}$ in., rather coriaceous, nerves 6–7 pair; petiole very short; stipules triangular. *Cymes* 1–2 in.; lower bracts often foliaceous. *Corolla* $\frac{1}{2}$ in. diam., 4–5-cleft. *Style* hairy; stigma slender fusiform, shortly exserted. *Ovules* 1 in each cell. *Fruit* size of a large pea, sometimes oblong and diseased; calyx-limb persistent.

VAR. 1. leaves narrowly oblong-lanceolate. Coffea alpestris, *Wt. Ic.* t. 1040.

VAR. 2. leaves obovate. Coffea Grumelioides, *Wt. Ic.* t. 1041.

†† *Tube* (*or tube and limb in* W. campaniflora) *of corolla longer than the lobes.*

17. **W. campaniflora,** *Hook. f.*; leaves elliptic or elliptic-lanceolate acuminate above glabrous or scaberulous beneath pubescent or glabrate, nerves 12–15 pair, cymes sessile or deflexed in bud hirsute, flowers sessile and pedicelled, calyx hirsute teeth ovate-lanceolate, corolla puberulous, tube short, limb campanulate, lobes short ovate acute. Stylocoryne Webera, *Wall. Cat.* 8401 K.

CHITTAGONG, *Bruce*; Seetakoond, *J. D. H. & T. T.*; Burkul, *C. B. Clarke.*

A large bush or small tree; branches rather slender, glabrous, except the young shoots. *Leaves* 4–12 by 2–4 in., nearly black when dry, membranous, usually shining above, beneath hispidly pubescent or puberulous or glabrate, nerves slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., hispid or glabrate; stipules triangular, cuspidate. *Cymes* at first sharply decurved, at length horizontal or suberect, 1–3 in. long, lower branches spreading; bracts persistent, lanceolate, lower stipuliform; flowers $\frac{3}{4}$ in. long, when pedicelled ebracteolate at the base; buds with a very short tube and large fusiform acute limb. *Calyx-teeth* longer than the ovary. *Corolla-limb* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., throat glabrous, tube villous within. *Anthers* long, sessile. *Style* short, hairy; stigma very long, fusiform, curved, grooved. *Ovules* solitary in each cell.—A very remarkable species; the corolla is quite unlike that of any other. A Malacca plant in young fruit of Griffith's (Kew Distrib. 2795) may be it, as also a Mergui one of Griffith's in Wight's Herbarium, also in fruit only.

18. **W. canarica,** *Hook. f.*; glabrous, leaves elliptic or oblanceolate acuminate glabrous on both surfaces, nerves about 15 pair, cymes small sessile few-fld. puberulous, branches very stout, flowers shortly pedicelled ebracteolate at the base, calyx obconic obscurely toothed, corolla-tube cylindric about twice as long as the linear lobes, style pubescent. ? Pavetta canarica, *Bedd. Fl. Sylv., For. Man.* 134/8.

SOUTH CANARA; on the Ghats, *Beddome.* COCHIN, *Wight.*

Branches stout. *Leaves* 6–8 by 2–$2\frac{1}{2}$ in., dark green when dry, membranous; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Bracts* short, triangular. *Buds* 1 in., cylindric, obtuse; corolla lobes linear, half the length of the tube or more, throat glabrous, tube villous within. *Anthers* sessile. *Style* pubescent; stigma very long, narrowly fusiform. *Ovules* one in each cell, on large placentas.—Doubtfully identified with Beddome's insufficient diagnosis.

19. **W.? nilagirica,** *Hook. f.*; young branches pubescent, leaves obovate-lanceolate subcaudate-acuminate pubescent beneath, nerves 12–15 pair, cymes

small sessile few-flowered pubescent, flowers shortly pedicelled ebracteolate at the base, calyx obconic, teeth short broad, corolla-tube cylindric much longer than the short lobes, style glabrous, stigma very slender. ? Pavetta nilagirica, *Bedd. Fl. Sylv., For. Man.* 134/8.

NILGHERRY MTS.; Sispara Ghat and Peria Peak, Wynaad, *Beddome, G. Thomson.*
Branches stout. *Leaves* 4–9 by 1½–2½ in., greenish when dry, glabrous above; petiole ½ in., stout; stipules shortly triangular. *Cymes* 1 in., and buds similar to those of *W. canarica*, but the branches more pubescent, and the calyx-teeth more prominent. *Corolla* (seen in bud only) more resembling a *Pavetta* than a *Webera*, as do the very slender styles with the stigma not thickened or fusiform at all, and the sessile anthers; but the flowers are 5-merous. It is probably a 5-merous *Pavetta*, and possibly a form of the protean *P. indica*.

20. **W. Helferi,** *Hook. f.*; branches slender glabrous, leaves elliptic-lanceolate or oblanceolate caudate-acuminate membranous glabrous, nerves 10 pair, peduncle long slender glabrate branches pubescent, flowers pedicelled ebracteolate at the base, calyx-teeth subulate shorter than the tube, corolla puberulous, tube slender much longer than the short broad lobes. Ixora Helferi, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 17.

TENASSERIM, *Helfer.*
Leaves 5–8 by 1½–2 in., blackish when dry, narrowed into the short petiole; stipules ovate, acuminate, glabrous. *Peduncle* 4–6 in., inclined or drooping; cyme brachiate, branches slender; bracts linear-subulate, or the lower pair leafy. *Flowers* pedicelled. *Calyx-teeth* subulate. *Corolla-tube* ⅔ in.; lobes broadly oblong, ¼ the length of the tube; throat glabrous. *Style* fusiform, slender; stigma shortly exserted, slender, fusiform. *Ovules* 1 in each cell.

43. BYRSOPHYLLUM, *Hook. f.*

Glabrous shrubs or small trees; branches robust, terete. *Leaves* very coriaceous; stipules large, deciduous. *Flowers* large, diœcious, white or pink, in terminal few-fld. corymbs or fascicles; bracteoles small, scale-like. *Calyx-tube* (of ♀) hemispheric; limb short, cupular, persistent. *Corolla* coriaceous, tube long, throat campanulate, mouth contracted, villous; lobes oblong, obtuse, twisted in bud. *Stamens* 4–6, on the mouth of the corolla; anthers sessile, linear-oblong, included. *Ovary* 2-celled; style filiform, stigma spindle-shaped or stigmas 2 acute cohering; ovules numerous, immersed in fleshy placentas adnate to the septum. *Berries* ovoid or globose, 2-celled, many-seeded. *Seeds* oblong, flattened, imbricate in 2 series, immersed in pulp.—DISTRIB. 2 Indian species.

1. **B. ellipticum,** *Hook. f. in Gen. Pl.* ii. 83; leaves elliptic or elliptic-obovate cuspidate, flowers 4–6-merous, stigma 2-lobed. Coffea? elliptica *and* Stylocoryne elliptica, *Thw. Enum.* 154 and 421; *Bedd. Ic. Pl. Ind. Or.* t. 96.

CEYLON, at no great elevation, *Thwaites.*
A small tree, dark brown when dry. *Leaves* 4–7 by 2–3 in., sometimes obovate; petiole very stout, ½–1 in.; stipules convolute, oblong, acute. *Peduncles* 1–3, ½–¾ in. *Calyx* small, truncate. *Corolla* white; tube slender, ¾–1 in.; lobes ½ in. *Berries* 1 in. diam., globose, about 10-seeded.

2. **B. tetrandrum,** *Hook. f. in Gen. Pl.* ii. 83; leaves obovate or elliptic-oblong, tip rounded, flowers 4-merous, stigma entire. *Bedd. Fl. Sylv.* t. 326. Gardenia tetrandra, *Bedd. Ic. Pl. Ind. Or.* t. 20.

TRAVANCORE MTS., alt. 5000 ft.; Athraymallay, *Captain Davidson.*
A shrub or small tree, dark brown when dry. *Leaves* 3–5 by 1½–2 in., shining

above; petiole very stout, $\frac{1}{2}$–1 in.; stipules some triangular-lanceolate acuminate, others complicate broadly oblong, subacute. *Peduncles* 1–3, $\frac{1}{4}$–$\frac{1}{2}$ in. *Calyx* small, truncate. *Corolla* white tinged with rose; tube 1 in.; lobes $\frac{1}{2}$ in. *Berry* about $\frac{3}{4}$ in. diam.

44. **BRACHYTOME,** *Hook. f.*

A glabrous shrub or small tree; branches slender, terete. *Leaves* petioled, membranous, caudate-acuminate; stipules triangular, acuminate, persistent. *Flowers* polygamo-diœcious, white, small, in slender panicles. *Cymes* from the axil of an undeveloped leaf (hence leaf-opposed); bracts minute. *Calyx-tube* oblong; limb cupular, 5-toothed, persistent. *Corolla* long or funnel-shaped; tube (in fl. ♂ shorter) within and throat glabrous; lobes 5, short, twisted in bud. *Stamens* 5, inserted on the corolla-throat; anthers subsessile, included, linear-oblong, imperfect in fl. ♀. *Disk* in ♀ small, in ♂ cupular. *Ovary* 2-celled; style filiform (short in ♂), stigmas 2, shortly oblong obtuse grooved; ovules very numerous, superficial on peltate tumid placentas. *Berries* small, ellipsoid, 2-celled, many-seeded. *Seeds* crowded, cuneate, compressed, testa thin reticulate, albumen fleshy; embryo small, sub-cylindric.—Perhaps better united with *Randia*, but the habit and flowers are peculiar, and the seeds have a reticulated testa.

1. **B. Wallichii,** *Hook. f. in Ic. Pl.* t. 1088; *Kurz For. Fl.* ii. 51. Rubiacea, *Wall. Cat.* 8464, 8466.

KHASIA MTS., alt., 3–4000 ft., *De Silva, Griffith* (Kew Distrib. 2787), &c.—DISTRIB. Ava; Birma, alt. 5500 ft. (*Griffith*).

Pale brown when dry. *Leaves* 5–9 by 1–2 in., oblong or obovate-lanceolate, almost caudate-acuminate; nerves slender; petiole $\frac{1}{4}$ in. *Cymes* short, irregularly branched, $\frac{1}{2}$–2 in. diam., lax-flowered. *Corolla* $\frac{1}{3}$ in. long. *Berry* $\frac{1}{3}$ in. long, crowned with the calyx-limb.—Griffith's specimens are marked Darjeeling, but as no other collector has found it in Sikkim, I suspect some error.

45. **ANOMANTHODIA,** *Hook. f.*

A subscandent glabrous shrub; branchlets soft compressed and inflorescence hairy. *Leaves* bifarious, obliquely auricled; stipules interpetiolar, triangular, deciduous. *Corymbs* appearing supra-axillary (from the suppression of the leaves at the flowering nodes); peduncles 3-chotomous; bracts small, triangular, and bracteoles persistent. *Flowers* small, white, sessile, polygamo-diœcious. *Calyx-tube* turbinate; limb cylindric or cupular, 5–6-toothed, deciduous. *Corolla* salver-shaped, tube short, throat with reflexed hairs; lobes 5–6, longer than the tube, reflexed, twisted in bud. *Stamens* 5–6, subsessile on the corolla-mouth; anthers narrow, acute (recurved in the male), cells septate. *Disk* tubular. *Ovary* 2-celled; style stout, branches 2-lanceolate ribbed; ovules many. *Berries* globose, 2-celled, very many-seeded. *Seeds* minute, crowded, cuneate, testa thick.

1. **A. auriculata,** *Hook. f. in Gen. Pl.* ii. 87; Webera auriculata, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 537. Stylocoryne auriculata, *Wall. Cat.* 8402. Cupia auriculata, *DC. Prodr.* iv. 394. Pseudixora? auriculata, *Miq. Fl. Ind. Bat.* ii. 210. Psychotria? *Wall. Cat.* 8338.

SINGAPORE, PENANG, and MALACCA, *Porter, Wallich, Maingay* (Kew Distrib. 903, 904, 936).—DISTRIB. Borneo.

Branches stout, and leaves dark brown when dry. *Leaves* 4–9 by $2\frac{1}{4}$–4 in., coriaceous, elliptic or elliptic-oblong, shining above; nerves slender; stipules $\frac{1}{4}$ in. *Cymes* corymbose, 4–8 in. diam., very many-flowered; stout peduncle and branches com-

pressed; leaf at the node very small. *Flowers* subsessile. *Calyx* $\frac{1}{8}$ in. long. *Corolla* $\frac{1}{2}$ in. diam. *Berries* size of a pea.—The inflorescence is that of *Randia densiflora*, to which genus this might be reduced.

46. **RANDIA,** *Linn.*

Shrubs or trees, unarmed or spinous. *Leaves* opposite or with one often arrested; stipules short, intra-petiolar, free or connate. *Flowers* in axillary or leaf-opposed cymes on solitary or fascicled or corymbose, rarely terminal, white or yellowish. *Calyx-tube* various; limb often tubular; lobes short, long or leafy. *Corolla* funnel- salver- or bell-shaped, tube long or short, throat glabrous or hairy; lobes 5, rarely more, short or long, twisted in bud. *Stamens* 5; anthers subsessile, narrow. *Disk* annular or cushion-shaped. *Ovary* 2- rarely 3–4-celled; style short or slender, stigma usually fusiform, entire or 2-fid; ovules usually numerous, sunk in placentas attached to the septum. *Berries* globose, ellipsoid or ovoid, 2-celled, many-seeded. *Seeds* often immersed in pulp, angled, testa thin, albumen horny; cotyledons orbicular.—DISTRIB. Species about 90, all tropical.

SECT. I. **Eurandia.** Erect unarmed or spinous shrubs. *Flowers* small or moderate-sized, solitary or few and fascicled. *Corolla* tubular or funnel-shaped, glabrous or nearly so. *Berry* small. *Albumen* uniform.

1. **R. tetrasperma,** *Roxb. Fl. Ind.* i. 709 (Gardenia); branches spinescent, leaves elliptic or obovate glabrous, flowers subsolitary, calyx-tube terete hardly produced above the ovary, corolla-tube very short, berry globose 4-seeded. *Brand. For. Fl.* 272. Gardenia densa, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 559. G. tetrasperma *and* densa, *DC. Prodr.* iv. 381, 383. G. longispina, *Wall. Cat.* 8277 D. *partly.* G. sp., *Wall. Cat.* 8276, 8278, 8280, 8286.

SALT RANGE and SUBTROPICAL HIMALAYA, from Kashmir eastwards, ascending to 4–6000 ft. in Kumaon and to 7000 ft. in Sikkim and Bhotan. ASSAM. SILHET.

An erect rigid bush, 6 ft.; branches woody; bark rough. *Leaves* towards the tips of the branchlets, $\frac{1}{2}$–2 in., pale brown when dry, narrowed into the short petiole; stipules small, triangular-subulate. *Flowers* sessile, greenish-white, fragrant, $\frac{1}{4}$ in. diam. *Calyx-teeth* subulate. *Corolla-tube* $\frac{1}{8}$ in. long; lobes oblong. *Anthers* exserted, tip subulate. *Stigma* spindle-shaped. *Berry* $\frac{1}{4}$ in. diam.

2. **R. fasciculata,** *DC. Prodr.* iv. 386; spines axillary, leaves ovate elliptic or lanceolate acute glabrous or slightly hairy, flowers fascicled, calyx-tube terete produced above the ovary, corolla-tube long slender, berry globose many-seeded. *Brand. For. Fl.* 273. R. rigida, *DC. l. c.* R. malabarica, *Wall. Cat.* 8255 A. B. D. Gardenia fasciculata, *Roxb. Hort. Beng.* 15. G. rigida *and* parviflora, *Wall. Cat.* 8257 A. B., 8256. Posoqueria fasciculata, *Roxb. Fl. Ind.* i. 717. P. rigida, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 570. Webera fasciculata, *Kurz For. Fl.* ii. 49. Rubiacea, *Wall. Cat.* 8283.

TROPICAL HIMALAYA, from Nipal to Bhotan, ascending to 4000 ft. KHASIA MTS., ASSAM, SILHET and TENASSERIM, *Wallich*, &c.

A spreading shrub; branches glabrous, hairy or tomentose; bark smoothish. *Leaves* 1–5 by $\frac{1}{2}$–$1\frac{1}{2}$ in., pale when dry, base rounded or narrowed; petiole short; stipules narrowly lanceolate. *Calyx-limb* produced after flowering, cylindric, circumsciss, glabrous or pubescent, teeth linear. *Corolla* white (yellow in Roxburgh's drawing), fragrant; tube $\frac{1}{2}$–$1\frac{1}{4}$ in.; limb $\frac{2}{3}$–$1\frac{1}{2}$ in. diam.; lobes oblong, apiculate. *Stigma* large, fusiform, shortly exserted. *Berry* purple, size of a pea; cells about 6-seeded.

SECT. II. **Ceriscus.** Erect unarmed or spinous shrubs. *Flowers* small or moderate-sized, solitary or few and fascicled. *Calyx-lobes* broad, obtuse. *Corolla*

campanulate, tube usually short, lobes broad reflexed. *Berry* large, many-seeded, crowned with the calyx-limb.

3. **R. uliginosa,** *DC. Prodr.* iv. 386; glabrous, spines short straight or 0, leaves obovate or oblong obtuse, flowers solitary white, calyx-tube terete, corolla glabrous externally. *W. & A. Prodr.* 398; *Wight Ic.* t. 397; *Dalz. & Gibs. Bomb. Fl.* 119; *Brand. For. Fl.* 273; *Kurz For. Fl.* ii. 44; *Clarke in Journ. Linn. Soc. Bot.* xvii. 161. Gardenia uliginosa, *Retz Obs.* ii. 14; *Roxb. Cor. Pl.* t. 135; *Wall. Cat.* 8295. ? G. pomifera, *Wall. Cat.* 8296 (an unarmed specimen). Posoqueria uliginosa, *Roxb. Fl. Ind.* i. 712.

Eastern, Central, and Southern India, not common northwards. SIKKIM, *J. D. H.*, ASSAM, *Hamilton*.—DISTRIB. Ava (G. pomifera, *Wall.*).

A small, usually very rigid tree, with thick wooly 4-angled branches, and leaves (except on young shoots) at the ends of the branchlets. *Leaves* 2–8 by 1–4 in., pale when dry, narrowed into the short slender petiole; stipules triangular. *Flowers* dimorphic, either large and sessile, or small and peduncled. *Calyx-tube* 1½ in.; lobes rounded. *Corolla* of the large form 1 to nearly 2 in. diam.; lobes rounded; tube with a ring of hairs within; of the small form with a very short tube glabrous within. *Stigma* fusiform, 2-lobed in the sessile-flowered, entire in the peduncled. *Berry* 2 in. long, yellow, ellipsoid in the sessile-flowered, smaller in the peduncled-flowered. *Seeds* compressed, smooth.—Fruit sold in the markets, eatable.

4. **R. dumetorum,** *Lamk. Ill.* t. 156, f. 4; *DC. Prodr.* iv. 385; spines stout straight, leaves obovate glabrous or pubescent, flowers solitary, calyx-tube terete strigose, corolla hairy externally, berry many-seeded. *W. & A. Prodr.* 397; *Wight Ic.* t. 580; *Dalz. & Gibs. Bomb. Fl.* 119; *Bedd. Fl. Sylv., Anal. Gen.* t. xvi. f. 1; *Brand. For. Fl.* 273. R. nutans, longispina *and* floribunda, *DC. & W. & A.*; *Dalz. & Gibs. l. c.*; *Kurz For. Fl.* 45; *Wight Ic.* t. 581, 582, 583. R. Rottleri, *W. & A. l. c.* R. stipulosa, *Miq. Fl. Ind. Bat.* ii. 228. R. spinosa, *Blume Bijd.* 981. R. malabarica, *Wall. Cat.* 8255 *e.* ? R. tomentosa, *W. & A. Prodr.* 398; *Wall. Cat.* 8264 A. Gardenia nutans, *Roxb. Hort. Beng.* 15; *Wall. Cat.* 8290. G. spinosa, *Linn. fil.* G. longispina *and* floribunda, *Roxb. and others.* G. dumetorum, *Retz.*; *Roxb. Cor. Pl.* t. 136; *Wall. Cat.* 8259. G. stipularis, *Rottl. & Willd.*; *DC. l. c.* 383. G. glabra *and* G. propinqua, *Br. in Wall. Cat.* 8258, 8260. G. latifolia, *Schlecht in Herb. Hohen.* No. 861. Posoqueria dumetorum, P. nutans, P. longispina, *and* P. floribunda, *Roxb. Fl. Ind.* i. 713 to 719. Ceriscus malabaricus, *Gaertn. Fruct.* i. t. 28.

SUBTROPICAL HIMALAYA from Jamu eastwards, ascending to 4000 ft. in Sikkim; and thence southwards to CHITTAGONG, PEGU, MARTABAN, the WESTERN PENINSULA, and CEYLON (not recorded from Assam, the Khasia Mts., Silhet, or the Eastern Peninsula). —DISTRIB. Java, Sumatra, S. China, E. trop. Africa.

A small tree or rigid shrub; spines horizontal, often long and strong. *Leaves* 1–2 in., glabrous or harshly or softly pubescent on one or both surfaces, obtuse or subacute, narrowed into the short petiole; stipules ovate, acuminate. *Flowers* rarely 2–3 on a peduncle, subsessile, greenish yellow or white. *Calyx* strigose; teeth very variable, sometimes spathulate. *Corolla* ½–¾ in. diam.; lobes oval or oblong. *Berry* globose or ovoid, ¾–1½ in. long, glabrous or pubescent, smooth or obscurely ribbed, yellow, pericarp thick. *Seeds* compressed, imbedded in pulp.—Wight and Arnott's *R. tomentosa*, of which very imperfect fruiting specimens only are known, is either a form with leaves softly tomentose beneath, and a globose slightly ribbed peduncled fruit, or a different species.

5. **R. tomentosa,** *Blume in DC. Prodr.* iv. 379 (Gardenia); spines very long, shoots and leaves beneath densely velvetty, leaves obovate or orbicular subacute pubescent above, calyx-tube ribbed and corolla velvetty, berry many-seeded. Gardenia tomentosa, *Wall. Cat.* 8264 B. G. dasycarpa, *Kurz in Journ. As. Soc.* 1872, ii. 412.

TENASSERIM, MARTABAN, and PEGU, *Wallich*, &c.; *Helfer* (Kew Distrib. 2823).—DISTRIB. Java.

A large shrub; branches very stout; spines horizontal, 1–2 in., very stout. *Leaves* brown when dry, 1–2 in., often subcuneate, coriaceous; stipules triangular. *Flowers* subsolitary, subsessile, 1 in. diam. *Calyx-teeth* 5–10, linear, erect. *Corolla-lobes* oblong-obovate, silky within. *Stigma* globose, 2-lobed. *Berry* broadly ellipsoid, 1½–1¾ in. diam., velvetty, ribbed.

SECT. III. **Oxyceros.** Climbing or erect, armed (or young shoots unarmed) shrubs or trees. *Flowers* in shortly peduncled cymes. *Corolla* salver-shaped, tube longer or (in *R. malabarica*) shorter than the limb, glabrous externally. *Berry* small, about 8-seeded, the calyx-limb deciduous.

6. **R. malabarica,** *Lamk. Dict.* iii. 25; erect, glabrous, spines straight or 0, leaves elliptic obovate or oblong, cymes short, flowers fascicled, corolla-tube shorter than the lobes. Gardenia fragrans, *Koen.*; *Roxb. Cor. Pl.* t. 137; *Roth Nov. Sp.* 150; *Wall. Cat.* 8267. Posoqueria fragrans, *Koen. in Roxb. Fl. Ind.* i. 717. Stylocoryne Pandaki *and* S. malabarica, *DC. Prodr.* iv. 377. Griffithia fragrans, *W. & A. Prodr.* 400; *Wight Ic.* t. 310. Canthium parviflorum, *Schlecht. in Herb. Hohen.* No. 816. Gardenia sp. *and* Rubiacea, *Wall. Cat.* 8281, 8287.

WESTERN PENINSULA; on the hills, &c., from Canara southwards. CEYLON; not uncommon up to 3000 ft., *Walker*, &c.

An erect shrub; young shoots unarmed, "as is the whole plant when growing in a rich soil" (Roxb.). *Leaves* 1–2½ in., coriaceous, pale when dry; stipules small, triangular. *Cymes* subsessile, glabrous or puberulous, few or many-flowered, with connate triangular coriaceous bracts at the forks. *Calyx-tube* obconic, teeth minute. *Corolla* ¼–¾ in. diam. *Stigma* fusiform. *Berry* size of a pea, areole not raised. *Seeds* rough; albumen ruminated. Ceylon specimens have more elliptic leaves, looser cymes, larger flowers and more acute buds.

7. **R. longiflora,** *Lamk. Dict.* iii. 26; *Ill.* t. 156, f. 3; climbing, glabrous, spines short recurved or 0, leaves ovate elliptic or oblong, stipules broadly triangular, cymes short, corolla-tube much longer than the lobes. *DC. Prodr.* iv. 386. R. scandens, *DC. l. c.* 387. Posoqueria longiflora, *Roxb. Fl. Ind.* i. 718. Griffithia curvata, *Kurz in Trimen Journ. Bot.* 1875, 325. G. siamensis, *Miq. Fl. Ind. Bat.* ii. 158. Canthium recurvum *and* angulosum, *Wall. Cat.* 8284, 8285. Webera scandens, *Roxb. Fl. Ind.* i. 698. W. longiflora, bispinosa, *and* siamensis, *Kurz For. Fl.* ii. 48, 49. Tocoyena scandens, *Blume Bijd.* 980. Gardenia patula, *Horsf. in Miq. Fl. Ind. Bat.* ii. 232. Pseudixora javanica *and* Zollingeriana, *Miq. l. c.* 210. Stylocoryne bispinosa, *Griff. Notul.* iv. 260.

ASSAM, SILHET, and KHASIA MTS, ascending to 2000 ft.; common. CHITTAGONG, and southwards to MALACCA and PENANG. ANDAMAN and NICOBAR ISLANDS.—DISTRIB. Birma, Malay Islands.

A large shrub. *Leaves* 2–8 by 1–3 in., pale or dark when dry, coriaceous, often glandular at the nerve-axils beneath. *Peduncles* short or long, often from alternate axils of reduced leaves; cymes trichotomous; bracts as in *R. malabarica*. *Calyx* glabrous or puberulous, limb dilated, lobes triangular. *Corolla* white, then yellowish; tube ½–1½ in.; lobes ⅓ in. long, oblong. *Stigma* 2-fid. *Berries* globose, ⅓–½ in. diam., obscurely ribbed; areole flat or raised. *Seeds* rugose, imbedded in pulp; albumen ruminate.—A very variable plant, especially in the length of the corolla, but I cannot limit the varieties according to the definitions given to the species which I have here included under *R. longiflora*. Wallich's No. 8284 E. from Singapore (Finlayson) has a calyx ⅓ in. long, with almost filiform lobes half as long as the tube, and quite unlike those of any other variety. Others in Herb. Hooker and Bentham both from Wallich, with the ticket 8284 D. (Penang and Singapore) and 8284 C. (Silhet), but which are

not the plants thus numbered in the Linnæan Society's Herbarium, have very much larger flowers, the calyx ½–¾ in. long, with a cylindric tube above the ovary ½ in. long and irregularly cut at the top into 5 triangular teeth; the corolla tube 1 in. and lobes ⅔ in. long: the same, but with shorter calyces, is in Maingay's Herbarium.

8. **R. Griffithii,** *Hook. f.*; erect, glabrous, spines short straight or 0, leaves ovate or ovate-lanceolate acuminate, stipules subulate, berries globose. Griffithia, sp. 13, 14, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 2–4000 ft.; Mamloo, *Griffith* (Kew Distrib. No. 2800); Nurtiung and Nunklow, *J. D. H. & T. T.*

A small bright green tree; spines ascending, ¼ in. *Leaves* green or pale when dry, 2–5 by 1–1½ in., gradually acuminate, base acute; petiole ⅙–¼ in. *Cymes* few-flowered, subsessile; bracts as in *R. malabarica*. *Flowers* not seen. *Calyx-tube* after flowering, urn-shaped; limb dilated, minutely toothed, deciduous. *Berries* size of a pea, areolate, black. *Seeds* few, smooth; albumen even.—A very distinct species.

SECT. IV. **Gynopachys.** Shrubs or trees, erect or scandent, unarmed. *Leaves* in equal pairs except sometimes those at the flowering nodes. *Cymes* axillary, leaf-opposed. *Calyx-lobes* small. *Corolla-tube* rarely exceeding the lobes. *Berry* globose, usually small and soft.

9. **R. densiflora,** *Benth. Fl. Hongk.* 155; glabrous, unarmed, branches 4-angled, leaves elliptic-oblong or lanceolate, cymes leaf-opposed or from leafless nodes, bracts persistent, corolla-tube much shorter than the lobes, throat villous, berries globose many-seeded. Webera densiflora, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 536. W. oppositiflora, *Roxb. Fl. Ind.* i. 698; *Kurz For. Fl.* ii. 47. Stylocoryne densiflora, *Wall. Cat.* 8404 *excl.* A.; *Miq. in Ann. Mus. Lugd. Bat.* iv. 128, t. 5 A. S. dimorphophylla, *Teysm. & Binn. Pl. Nov. Hort. Bogor.* 4. Cupia densiflora *and* oppositifolia, *DC. Prodr.* iv. 394. Gynopachis axilliflora *and* oblongata, *Miq. Fl. Ind. Bat.* ii. 221. Urophyllum coriaceum, *Miq. l. c. Suppl.* 542. Ixora Thozetia, *F. Muell. Fragm.* ii. 132. Psychotria sp. *Wall. Cat.* 8332. Rubiacea, *Wall. Cat.* 8455, 8456, 8465.

ASSAM and NAGA hills, *Griffith*; CACHAR, *Keenan*; TENASSERIM, *Wallich*; ANDAMAN and NICOBAR ISLANDS, *Helfer, Kurz*; MALACCA, SINGAPORE, and PENANG, *Wallich, Griffith, Maingay*, &c.; TRAVANCORE, *Wight, Beddome*.—DISTRIB. Malayan Archipelago, N. Australia, Hongkong.

A large shrub or small tree, "sometimes epiphytal" (Keenan); branches glabrous or puberulous. *Leaves* dark brown when dry, 4–8 by 1–3 in., coriaceous, smooth; petiole ¼–½ in.; stipules triangular, acuminate. *Cymes* sessile or shortly peduncled, solitary or opposite from leafless nodes, or solitary and opposite a reduced leaf, or from the axil of a reduced leaf and opposite a developed one, branched from the base; branches flattened, divaricate, glabrous, puberulous or pubescent; bracts small, triangular. *Flowers* numerous, pedicelled. *Calyx* ¼ in.; teeth minute or 0. *Corolla* ½–¾ in. diam.; lobes glabrous or silky externally. *Stigma* slender, exserted. *Berry* size of a pea, areolate; cells 8- or more-seeded. *Seeds* rugose; albumen ruminate.—The inflorescence is that of *Anomanthodia*.

10. **R. Gardneri,** *Thw. Enum.* 158 (Griffithia); erect, glabrous, unarmed, leaves lanceolate acuminate, cymes axillary, bracts persistent, corolla-tube much longer than the lobes, throat pubescent or villous, berries longer than broad many-seeded. Griffithia Gardneri, *Bedd. Ic. Pl. Ind. Or.* t. 38. Randia Gardneri *and* laurifolia, *Hook. f. in Gen. Pl.* ii. 88.

CEYLON; Central Province, alt. 2–4000 ft., *Gardner*, &c.

Very closely allied indeed to *R. densiflora*, and perhaps better considered as the Ceylon form of that plant, but the leaves are more strictly lanceolate, the cymes always from the axils of fully formed leaves, and the berry is not globose but evidently, though slightly, elongated; the flowers are quite glabrous, except at the throat of the corolla, which is less villous than in *R. densiflora*.

11. **R. Wallichii,** *Hook. f.*; glabrous, subscandent, unarmed, branches robust rough, leaves elliptic-lanceolate acuminate, cymes solitary on the branches axillary sessile, bracts caducous, flowers very small glabrous, corolla-tube much shorter than the lobes, berries many-seeded. Rubiacea, *Wall. Cat.* 8445, 8466. Griffithia, sp. 11, *Herb. Ind. Or. H. f. & T.*

BHOTAN, *Griffith*; SILHET and KHASIA MTS., alt. 1–4000 ft., *De Silva*; CHITTAGONG, *J. D. H. & T. T.*; PEGU, *Kurz*; TENASSERIM, *Helfer*, &c.—DISTRIB. Yunan, Java.

A tree; branches flexuous (as if twining), very stout, with rough soft red-brown bark. *Leaves* 4–9 by 1½–2½ in., brown when dry, smooth, coriaceous, shining above, narrowed at the base; petiole ¼–½ in., stout; stipules broadly ovate-lanceolate, sheathing, coriaceous. *Cymes* from the upper axil of each branch; branches spreading, stout in fruit, ebracteate or with a few caducous triangular bracts. *Flowers* shortly pedicelled. *Calyx* turbinate, minutely toothed. *Corolla* ⅓ in. diam. *Stigma* entire. *Berry* globose, ⅓–⅔ in. diam. *Seeds* peltate, smooth; albumen uniform.

12. **R. rugulosa,** *Thw. Enum.* 159 (Griffithia); glabrous, climbing, unarmed, leaves elliptic obtuse or obtusely acuminate, cymes several on each branch leaf-opposed, bracts large subpersistent, corolla-tube much shorter than the lobes, mouth pubescent, berries several-seeded. Stylocoryne, sp. *Wall. Cat.* 8466.

WESTERN PENINSULA; on the Ghats, from the Concan southwards, ascending to 4000 ft., *Heyne, Wight*, &c. CEYLON; Ambagamowa, Saffragan and Galle districts, not common, *Champion, Thwaites.*

A large climbing shrub with stout pendulous branches. *Leaves* 3–7 by 1½–3 in., sometimes lanceolate, rarely acute, coriaceous; nerves very strong; stipules broad, coriaceous, acute, 2-glandular at the base within (*Thwaites*). *Cymes* with a short stout peduncle, glabrous or puberulous; branches very stout, spreading; bracts coriaceous, obtuse, often connate in pairs. *Flowers* pedicelled. *Calyx* hemispheric, glabrous or puberulous; teeth very variable, acute or obtuse. *Corolla* ⅓–⅔ in. diam., white; tube and lobes quite glabrous. *Berries* size of a pea. *Seeds* rugose.

VAR. *speciosa*; flowers 1½ in. diam. Griffithia speciosa, *Bedd. Ic. Pl. Ind. Or.* 8, t. 37.—South Canara to Travancore, *Beddome.*—I see nothing but the size of the flower to distinguish this from *R. rugulosa.* Though stated to be found over so great an area, I have seen no specimens.

13. **R. Candolleana,** *W. & A. Prodr.* 399; erect, unarmed, branches very stout, leaves long-petioled obovate or orbicular obtuse glabrous pubescent or velvety beneath, cymes subterminal axillary or from naked nodes, corolla silky externally, lobes much longer than the tube, berries several-seeded. R. corymbosa, *W. & A. l. c.* R. deccanensis, *Bedd. Ic. Pl. Ind. Or.* 57, t. 137. Rubiacea, *Wall. Cat.* 8293.

WESTERN PENINSULA; Nagur Hills, Mysore, *Wight*; Nallay Mallay Hills, near Kurnook, *Beddome.*

A small tree with naked woody branches and rough bark. *Leaves* 1–3 in., sometimes nearly as broad, glabrous above, beneath softly velvety or glabrous or with axillary tufts of hairs, dark brown when dry; petiole ½–1½ in.; stipules broadly ovate. *Cymes* sessile, branches spreading; bracts caducous. *Calyx-tube* glabrous, campanulate; limb produced, much dilated, teeth subulate. *Corolla* ½ in. diam.; lobes broadly oblong, glabrate within. *Stigma* globose. *Berries* ⅔ in. diam., globose, with a small elevated areole; pericarp thin, crustaceous and shining within. *Seeds* numerous, small, imbedded in pulp, compressed, quite smooth.

SECT. V. **Anisophyllea.** Unarmed shrubs or trees with unequal pairs of leaves. *Cymes* axillary, tomentose or silky. *Corolla* densely silky or tomentose, tube equalling or exceeding the lobes. *Berry* large, endocarp woody, many-seeded. (Fruit unknown in *R. sikkimensis.*)

14. **R. anisophylla,** *Jack in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 561; softly villous or tomentose, erect, unarmed, leaves large obovate cuspidate pairs unequal, cymes axillary villous, corolla silky, lobes equalling the tube, berry woody ellipsoid tomentose many-seeded crowned with a tubular calyx-limb. Gardenia? anisophylla, *Wall. Cat.* 8399; *DC. Prodr.* iv. 381.

MALACCA, PENANG, and SINGAPORE, *Jack*, &c.

A small tree; branches robust, villous. *Leaves* 9–15 by 3½–5 in., pale brown, variable as to pubescence, narrowed at the base; petiole short; stipules united into a villous 2-lipped tube bearded within. *Cymes* stoutly peduncled, many flowered; bracts deciduous. *Flowers* pedicelled, white. *Calyx* ovoid, tomentose; limb tubular, silky within; teeth ovate-subulate, deciduous. *Corolla* coriaceous, ½–¾ in. diam.; lobes oblong. *Stigma* fusiform. *Berry* 1–1½ in. long; pericarp thin with a woody endocarp. *Seeds* many, compressed, smooth.

15. **R. sikkimensis,** *Hook. f.*; pubescent, erect, shrubby, unarmed, leaves in unequal pairs elliptic or elliptic-lanceolate acuminate slightly pubescent above more so beneath, cymes axillary tomentose, corolla densely silkily tomentose, tube longer than the oblong lobes bearded within below the middle.

Foot of the SIKKIM HIMALAYA; on dry hills below Kursiong, alt. 4000 ft., *J. D. H.*

A woody shrub; branches stout, leafy at the tips. *Leaves* brown when dry, 4–7 by 1½–2½ in., rather membranous, with scattered hairs above, tomentose especially on the nerves beneath; petiole short, tomentose; stipules very broad, acute or cuspidate, connate in a glabrous or hairy tube, or free. *Cymes* sessile; branches erect, short, bracts small, acute. *Flowers* pedicelled, erect. *Calyx* pubescent, funnel-shaped; limb dilated, teeth subulate. *Corolla* 1 in. diam.; tube nearly 1 in. long, very silky; lobes not half as long, obtuse, glabrous within; mouth glabrous. *Stigma* clavate, 2-lobed. *Ovary* 2-celled, many-ovuled; ovules apparently not sunk in the placenta.—Specimens not numerous or good.

SECT. VI. **Gardenioides.** An unarmed tree. *Flowers* cymose. *Calyx-lobes* small. *Corolla-tube* very short; limb inflated, very large, 5-lobed. *Berry* large, globose, with a woody rind, many-seeded.

16. **R. exaltata,** *Griff. Notul.* iv. 262; glabrous, erect, unarmed, leaves elliptic or elliptic-lanceolate acute or subacute, cymes axillary or leaf-opposed pubescent, corolla very large, tube short, limb inflated, berry large woody many-seeded. *Kurz For. Fl.* ii. 46. Gardenia pulcherrima, *Kurz in Journ. As. Soc.* 1872, ii. 312; 1877, ii. 155; *For. Fl.* ii. 43.

TENASSERIM; Mergui, in Mangrove Swamps, *Griffith* (Kew Distrib. 2826). ANDAMAN ISLANDS, *Kurz.*

A tree, 50 ft.; trunk slender; branches with pale bark, youngest compressed and pubescent. *Leaves* 4–7 by 2–3½, greenish when dry, coriaceous; petiole short; stipules broadly triangular. *Cymes* subsessile; branches stout, short, few-flowered. *Calyx* tomentose; teeth triangular. *Corolla* white, sweet-scented, 3 in. long; limb campanulate, 1½ in. across the broad ovate lobes; throat naked. *Anthers* slender, included. *Style* filiform; stigma included, clavate, 2-lobed. *Berry* globose, 1–1½ in. diam.; pericarp smooth, very woody. *Seeds* imbedded in pulp, ⅓ in. across, much compressed, obtusely angled, smooth or wrinkled.—Griffith, and Kurz (copying him), describes the leaves as unequal subrepand and pubescent at the nerve-axils beneath.

SECT. VII. **Euclinia.** Unarmed erect shrubs. *Leaves* in equal pairs. *Flowers* solitary or fascicled, axillary or terminal. *Calyx-lobes* very long. *Corolla* large, funnel-shaped.

17. **R. macrophylla,** *Br. in Wall. Cat.* 8304 (Rothmannia); erect, unarmed, branches and leaves beneath hispid or glabrate, leaves subsessile nar-

rowly elliptic-oblong or oblanceolate, flowers 1–2 subterminal, corolla 6 in. hairy.

MALACCA, PENANG, and SINGAPORE, *Wallich*, *Griffith*, &c.

A shrub, 3–4 ft. high; branches few, 2-leaved at the top (*Griffith*). *Leaves* 10–12 by 2–3 in., acuminate, coriaceous, glossy above with pubescent midrib, more or less hispidly pubescent in the midrib and strong arched nerves beneath, base acute or obtuse; petiole very short, stout, hispid; stipules long-subulate from a broad triangular base. *Flowers* subsessile, fragrant. *Calyx-tube* oblong; lobes 1 in., linear, erect, hairy. *Corolla* white with purple spots in lines on the throat, 4 in. across the short reflexed lobes. *Anthers* very long. *Stigma* clavate, notched.

18. **R. hygrophyla,** *Kurz in Journ. As. Soc.* ii. 321; *For. Fl.* ii. 44 (Gardenia); glabrous, shrubby, erect, unarmed, leaves small shortly petioled elliptic obovate or lanceolate subacute, flowers solitary subsessile axillary or in the forks of the branches, corolla 1 in. glabrous.

PEGU; frequent in swampy forests, *Kurz.*

An evergreen shrub, 1–3 ft., often spreading. *Leaves* 2–3 in., black when dry, very variable in breadth, quite glabrous, base acute; petiole $\frac{1}{6}$ in.; stipules connate, glabrous or hairy. *Calyx-tube* short, pubescent; lobes much longer than the tube, linear-subulate, ciliate. *Corolla* rather broadly funnel-shaped; lobes unequal, about $\frac{1}{2}$ in. long. *Ovary* completely 2-celled.

47. GARDENIA, *Linn.*

Shrubs or trees, armed or not. *Leaves* opposite, rarely 3-nately whorled; stipules intrapetiolar, often connate. *Flowers* often very large, terminal or axillary, solitary fascicled or rarely cymose, often dimorphic and polygamous. *Calyx-tube* various; limb tubular or dilated, variously cleft or lobed. *Corolla* very various, lobes 5–12, twisted in bud. *Stamens* as many as the corolla-lobes; anthers sessile or subsessile, linear, included, inserted in the tube. *Ovary* 1-celled; style stout, stigma clavate fusiform or 2-cleft; ovules numerous, 2-seriate on the 2–6 parietal placentas. *Fruit* often large, ovoid ellipsoid or globose, coriaceous, or fleshy with a woody endocarp polished within which sometimes splits along the placental sutures. *Seeds* very many, imbedded in the placenta, compressed; testa thin; embryo small, in horny albumen.—DISTRIB. Species about 60, tropical and subtropical.

G. FLORIDA, *L.*; *Roxb. Fl. Ind.* i. 703, &c.; *Wall. Cat.* 8268, is often cultivated in Indian gardens; it is an unarmed shrub, native of Japan and China, with small ovate acute leaves, white very strongly scented axillary flowers 1 in. diam. (often double), and an ellipsoid 5-ribbed fruit crowned by subulate calyx-teeth. The orange pulp of the fruit is used as a dye.

SECT. I. **Eugardenia.** Unarmed shrubs. *Flowers* large, axillary, solitary. *Corolla* salver-shaped; tube long, slender; lobes 4–9.

* *Calyx-limb tubular,* $\frac{1}{6}$–$\frac{1}{2}$ *in.; teeth* 5–9, *ovate-lanceolate or linear or short.*

1. **G. lucida,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 707; glabrous, leaves short-petioled elliptic obtuse or subacute shining many-nerved, flowers solitary axillary, calyx-teeth elongate, fruit ellipsoid or globose, placentas 2. *DC. Prodr.* iv. 381; *W. & A. Prodr.* 395; *Wt. Ic.* t. 575; *Dalz. & Gibs. Bomb. Fl.* 120; *Bedd. Fl. Sylv. Anal. Gen.* xv. f. 6; *Brand. For. Fl.* 271; *Wall. Cat.* 8270. G. resinifera, *Roth Nov. Sp.* 150; *Kurz For. Fl.* ii. 42.

WESTERN PENINSULA, common from the Concan southwards. CHITTAGONG, *Roxburgh*, &c. BIRMA, *Brandis.*

A small deciduous tree, shoots resinous. *Leaves* 3–10 by 2–5 in., green when dry, base narrowed; nerves 20–30 pair, with often bearded axils; stipules large, broadly ovate, connate. *Flowers* peduncled, fragrant, white turning yellow. *Calyx* variable, tube oblong; limb tubular; lobes narrow lanceolate, persistent. *Corolla-tube* 1½–2 in., glabrous or puberulous; limb 1½–3 in. diam., lobes 5 oblong. *Fruit* smooth; pericarp thick, woody (endocarp 2-valved, *Roxburgh*).

2. **G. gummifera,** *Linn. f.*: *DC. Prodr.* iv. 381; glabrous, leaves sessile or subsessile obovate acute or obtuse shining, calyx-teeth short ovate acute, fruit ellipsoid or oblong, placentas 4–5. *Roxb. Fl. Ind.* i. 709; *W. & A. Prodr.* 395; *Dalz. & Gibs. Bomb. Fl.* 270, *excl. syn.*; *Thunb. diss. Gard.* t. 2, f. 3. G. arborea, *Roxb. l. c.* 708. G. inermis, *Dietr. Vollst. Lex.* iv. 285. Rubiacea, *Wall. Cat.* 8294 A.

WESTERN PENINSULA, from the Satpura range southwards, *Heyne*, &c.

A woody bush; buds resinous. *Leaves* 1½–2½ in., coriaceous, base obtuse acute or cordate, sometimes puberulous beneath; nerves 15–20 pair; stipules connate, truncate or mucronate. *Flowers* subsessile, white. *Calyx-limb* shortly tubular, teeth stout subulate. *Corolla-tube* 1–2 in., glabrous or pubescent; limb 1–3 in. diam., lobes 5 oblong obtuse. *Fruit* 1–1½ in., with a stout beak, smooth; pericarp thin, woody (endocarp 4–5-valved, *Roxburgh*).—Roxburgh's name *G. arborea* is attached to Heyne's specimen in Herb. Wallich (*Rubiacea* 8294).

3. **G. obtusifolia,** *Roxb. Hort. Beng.* 15; glabrous, leaves sessile obovate-oblong tip rounded, nerves rather distant, calyx-teeth very short obtuse, fruit subglobose warted, placentas 4. *Kurz For. Fl.* ii. 43. G. suavis, *Wall. Cat.* 8274. Rubiacea, *Wall. Cat.* 8294 B.

PEGU and TENASSERIM, *Roxburgh*, &c., *Griffith* (Kew Distrib. 2819).

A small deciduous tree; shoots resinous. *Leaves* 2½–4 in., greenish when dry, rough to the touch on both surfaces; nerves 12–15 pair; stipules connate, sheathing. *Flowers* solitary, shortly pedicelled, white turning yellow. *Calyx* ½ in., tube puberulous, teeth very short. *Corolla-tube* 1½–2 in., limb 2–3½ in. diam.; lobes 5, linear-oblong, obtuse. *Fruit* as large as a pigeon's egg, beaked with the stout short calyx-tube; pericarp fleshy, warted with lenticels; endocarp thin, shining, crustaceous.

4. **G. latifolia,** *Ait. Hort. Kew*, i. 294; branches very stout, leaves opposite or 3-nate subsessile large broadly elliptic or orbicular obtuse glabrous or pubescent beneath, calyx-teeth subulate-lanceolate unequal pubescent, fruit globose smooth, placentas 4–5. *Roxb. Fl. Ind.* i. 706; *Cor. Pl.* t. 134; *DC. Prodr.* iv. 380; *W. & A. Prodr.* 395; *Wt. Ic.* t. 759; *Dalz. & Gibs. Bomb. Fl.* 120; *Brand. For. Fl.* 271; *Wall. Cat.* 8275; *Gaertn. Fruct.* i. t. 193.

Dry hilly districts of WESTERN, CENTRAL and SOUTH-WESTERN INDIA, from the N. W. HIMALAYA, in Garwhal only, ascending to 3000 ft., southwards to BEHAR and W. BENGAL; absent to the eastward of those limits.

A small tree with woody resinous branchlets as thick as the little finger. *Leaves* greenish, 4–8 in. long and sometimes almost as broad; nerves about 12 pair, axils glandular-hairy beneath; stipules large, tumid, connate, often split or toothed. *Flowers* solitary or 2-nate, subsessile, white changing to yellow, fragrant. *Calyx-limb* campanulate; segments 5–9, unequal, recurved. *Corolla-tube* 2–3 in., pubescent or hirsute; limb 2–4½ in. diam.; lobes 5–9, obovate, oblique. *Fruit* 1–2 in. diam., beaked by the calyx-limb, greenish, speckled; endocarp woody, shining within.—Roxburgh's drawing represents the calyx-teeth as very small, short and obtuse, and his description (Fl. Ind. l. c.) says calyx small, irregularly divided; my specimens in Herb. Wallich have teeth long and subulate. (See *G. enneandra* at end of genus.)

** *Calyx-limb tubular obconic or campanulate, 1–3 in., truncate toothed or sinuate, entire or split on one or both sides.*

5. **G. coronaria,** *Ham. in Syme's Embassy to Ava*, iii. 307, t. 22; leaves subsessile obovate shortly acuminate above shining glabrous or pubescent beneath, calyx-limb terete $\frac{1}{4}$–1 in. often spathaceous, corolla 5-lobed, tube 2–3 in., fruit ellipsoid 5-ribbed, placentas 2. *Kurz For. Fl.* ii. 43; *Wall. Cat.* 8273. G. costata, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 704; *DC. Prodr.* iv. 380; *Wall. Cat.* 8272. ? G. carinata, *Griff. Notul.* iv. 261; *Ic. Pl. Asiat.* t. 474, f. 3.

CHITTAGONG, *Roxburgh*, &c.; RANGOON, *M'Clelland*; MARTABAN, at Moulmein, *Falconer*, &c.

A deciduous tree 25–30 ft.; branches stout, youngest hairy; buds resinous. *Leaves* greenish when dry, 6–12 by 3–5 in., shining on both surfaces; nerves about 20 pair; stipules $\frac{1}{2}$ in., connate, lanceolate. *Flowers* subsessile, terminal, white changing to yellow, fragrant. *Calyx-limb* cylindric, shining, thin; mouth obscurely lobed, 5-angled, caducous. *Corolla-tube* 2–4 in., puberulous; limb 3–4 in. diam., lobes broad obtuse or acute. *Fruit* 1 in. long, smooth between the ribs; endocarp thick, woody. —In Roxburgh's drawings and Wallich's specimens of *G. costata* the calyx-limb is tubular, rather scarious, and cleft on one side, the mouth oblique. There are no fruits on Wallich's specimens. The endocarp is represented in Roxburgh's drawings as thin, but described as thick in the "Flora Indica." Wallich's specimens of *G. coronaria* have a thick woody endocarp, and shorter more coriaceous calyx-tube.

6. **G. carinata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 560; *Cat.* 8271; leaves subsessile obovate shortly acuminate shining above more or less pubescent beneath, calyx-limb 5-winged below the truncate mouth, corolla 6–9-lobed, tube 1 in., fruit ellipsoid 5-ribbed, placentas 2.

PENANG, *Porter*; MALACCA, *Maingay* (Kew Distrib. 837).

Closely allied to *G. coronaria*; differing in the thick wings of the truncate calyx-limb, which are sometimes produced quite up to its mouth and elongated into large teeth, and are decurrent on the peduncle; the corolla-tube is only 1 in. in all Wallich's specimens, though he describes it as "very long." The endocarp of the fruit is thin, as in that described under *G. coronaria*. Leaves in some of Maingay's specimens 16 by 7 in. and membranous.

7. **G. tubifera,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 562; *Cat.* 8266; leaves obovate-lanceolate abruptly acuminate glabrous or puberulous on the nerves beneath, calyx $\frac{1}{2}$ in. limb elongate obconic terete, mouth truncate, corolla-tube many times longer than the calyx very slender, fruit globose, endocarp very thick and woody, placentas 5–8. *DC. Prodr.* iv. 381. G. resinifera, *Korth. in Ned. Kruidk. Arch.* ii. 191; *Kurz in Journ. As. Soc.* 1876, ii. 134 (*not of Roth*). G. glutinosa, *Teysm. & Binnend. in Herb. Lugd. Bat.*

SINGAPORE, *Wallich*; MALACCA, *Maingay* (Kew Distrib. 838).—DISTRIB. Sumatra, Java, Borneo.

Subarboreous, young parts resinous. *Leaves* 5–9 in., shortly petioled, much narrower at the base, coriaceous; nerves 12–14 pair; petiole $\frac{1}{4}$–1 in.; stipules short, sheathing. *Flowers* subsessile. *Calyx* $\frac{3}{4}$ in. long, gradually dilated upwards, terete. *Corolla-tube* $1\frac{1}{2}$–3 in., limb 1 in. diam., lobes 6–9 short. *Fruit* 1–$1\frac{1}{2}$ in. diam., smooth or obscurely ribbed, crowned with the trumpet-like calyx-limb $1\frac{1}{2}$–$\frac{3}{4}$ in. long; endocarp $\frac{1}{4}$ in. thick, very hard. *Seeds* rather large.

8. **G. speciosa,** *Hook. Ic. Pl.* t. 824 (Randia); leaves petioled obovate-oblong tip rounded or cuspidate, nerves puberulous beneath, calyx $1\frac{1}{2}$ in. limb elongate obconic terete, mouth truncate, corolla-tube many times longer than the calyx.

SINGAPORE, *Lobb.*

Leaves 4–6 in. by 2 in., much broader than in *G. tubifera*, rounder at the tip, more abruptly narrowed at the base; nerves 12–14 pair; petiole longer; stipules short, sheathing. *Calyx-tube* longer and broader. *Corolla-tube* much stouter, 3–$3\frac{1}{2}$ in.; limb 6–9-lobed, 4 in. diam.; lobes narrowly ovate-oblong, obtuse. *Fruit* unknown.

9. **G. Griffithii,** *Hook. f.*; leaves subsessile elliptic-obovate cuspidate, nerves beneath puberulous, calyx-limb 3 in. tubular with a trumpet-shaped mouth, corolla-tube little longer, the calyx lobes broad, fruit large globose, pericarp very thick, placentas several.

MALACCA, *Griffith* (Kew Distrib. 2821).

Branches resinous. *Leaves* 6–8 by $1\frac{1}{2}$–3 in., coriaceous, much narrowed at the base; nerves 10–14 pair; stipules $\frac{1}{3}$ in., sheathing. *Flowers* sessile. *Calyx-tube* very coriaceous, terete; mouth oblique, $\frac{3}{4}$ in. diam., waved and wrinkled. *Corolla-tube* $2\frac{1}{2}$–4 in., one quarter or less exserted; limb 3 in. diam., many- (12-) lobed. *Fruit* large, probably $1\frac{1}{2}$ in. diam., with a thick exocarp and woody not very thick endocarp; placentas probably 5.—I have seen only a very imperfect fruit.

VAR. *Maingayi*; mouth of calyx irregularly cut into triangular coriaceous teeth. —Malacca, *Maingay* (Kew Distrib. 841).

SECT. II. **Ceriscus.** Shrubs, armed or unarmed. *Flowers* dimorphic, monœcious or diœcious. *Calyx-teeth* in the ♀ large, subfoliaceous; in the ♂ usually minute. (See *Clarke in Journ. Linn. Soc. Bot.* xvii. 310.) *Corolla* small (less than 1 in.), cylindric or campanulate.

10. **G. turgida,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 711; spines straight or 0, leaves elliptic obovate or orbicular obtuse acute or subacute coriaceous glabrous pubescent or tomentose beneath, ♂ flowers fascicled ♀ solitary, corolla salver-shaped, tube subcylindric, fruit not beaked. *DC. Prodr.* iv. 382; *Wt. Ic.* t. 579; *Brand. For. Fl.* 270; *Kurz For. Fl.* ii. 41; *Bedd. Fl. Sylv. Anal. Gen.* t. 15, f. 6; *Wall. Cat.* 8269; *Clarke in Journ. Linn. Soc. Bot.* xvii. 310. G. cuneata, *Br. in Wall. Cat.* 8263. G. Donia, *Ham. in Wall. Cat.* 8292.

TROPICAL HIMALAYA, ascending to 4000 ft., from Kumaon to Bhotan; OUDH, BEHAR, SILHET, PEGU and the WESTERN PENINSULA.—DISTRIB. Ava, *Wallich.*

A small deciduous tree, 25 ft.; branches rigid, robust; bark pale. *Leaves* 1–4 in., narrowed into a short petiole, pale when dry; stipules triangular, caducous. *Calyx* of ♂ small, $\frac{1}{6}$ in.; mouth wide, truncate; of ♀ $\frac{1}{3}$–$\frac{3}{4}$ in., limb shortly campanulate; teeth oblong or subspathulate, foliaceous. *Corolla* white, fragrant; tube slightly dilated upwards, $\frac{1}{3}$–$\frac{1}{2}$ in. long; limb 1 in. diam. *Fruit* 1–3 in., ovoid or globose, smooth, pericarp thick; endocarp woody, shining within; placentas 5 or 6.

VAR. *montana*, Roxb. Fl. Ind. i. 709 (sp.); leaves often orbicular densely tomentose beneath. G. montana, *DC. Prodr.* iv. 383; *W. & A. Prodr.* 396; *Wt. Ic.* t. 577; *Dalz. & Gibs. Bomb. Fl.* 120.—Occurs with *G. turgida*, and is even more common.

11. **G. campanulata,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 710; glabrous, spines straight, leaves obovate or elliptic-lanceolate membranous, ♂ flowers fascicled, ♀ solitary sessile, corolla campanulate, fruit not beaked. *Wall. Cat.* 8279; *DC. Prodr.* iv. 383; *Wt. Ic.* t. 578; *Kurz For. Fl.* ii. 40. G. longispina, *Wall. Cat.* 8277 D. *in part.* ? G. Blumeana, *DC. Prodr.* iv. 383.

Foot of the SIKKIM HIMALAYA, *J. D. H.*; ASSAM, SILHET, and CHITTAGONG, *Roxburgh, Griffith*, &c.; BEHAR, summit of Parus-nath, *J. D. H.*; PEGU, *Kurz.*—DISTRIB. Java?

A shrub, 15–20 ft.; shoots puberulous; spines $\frac{1}{2}$–$1\frac{1}{2}$ in., often leafy. *Leaves* $1\frac{1}{2}$–3 by $\frac{1}{2}$–$1\frac{1}{2}$ in., narrowed into the short petiole, midrib slender, nerves faint; stipules triangular, caducous. *Calyx* of ♂ $\frac{1}{3}$ in., urn-shaped, mouth truncate dilated; of ♀, limb campanulate, teeth oblong or subspathulate, foliaceous. *Corolla* $\frac{1}{4}$ in., white; lobes short, obtuse. *Fruit* $\frac{3}{4}$–$1\frac{1}{4}$ in., ellipsoid or subglobose, obscurely 5-ridged; pericarp very thick, endocarp woody, placentas 5.—Wight has figured the calyx as intermediate between the ♂ and ♀ form. *G. campanulata*, Blume (*G. Blumeana*, DC.), appears from the description and an imperfect specimen to be this.

12. **G. sessiliflora,** *Wall. Cat.* 8291; spines straight very strong, leaves elliptic or elliptic-lanceolate membranous puberulous on both surfaces or beneath,

flowers greenish polygamo-monœcious, ♂ fascicled pedicelled, ♀ sessile terminal, corolla velvety, tube very short and wide, fruit ovoid with a thick beak. *Kurz For. Fl.* ii. 40. G. oxycarpa, *Br. in Wall. Cat.* 8261.

PEGU and TENASSERIM, *Wallich, Kurz.*—DISTRIB. Ava.

A deciduous tree, 15–18 ft.; branches and spines very stout. *Leaves* very like those of *G. campanulata*, base much produced and narrowed. *Calyx* of ♀ flask-shaped, densely pubescent; lobes foliaceous, obovate-oblong or orbicular, exceeding the velvety corolla. *Fruit* 1½ in. long; pericarp rough, thick, fleshy, with a thin shining endocarp and 5? placentas.

13. **G. erythroclada,** *Kurz in Journ. As. Soc.* 1877, ii. 311; *For. Fl.* ii. 40; branches red stout, spines short or 0, leaves connate obovate or suborbicular pubescent or tomentose, flowers greenish polygamo-diœcious fascicled or cymose pedicelled, ♀ solitary sessile, fruits dimorphic of the ♂-hermaph. smaller globose, of the ♀-hermaph. ovoid.

PEGU; at Rangoon, *M'Clelland.* TENASSERIM and BIRMA, common in forests, *Kurz.*—DISTRIB. Ava.

A small deciduous tree with very stout branches of a curious brick red colour, shortly pubescent, or the leaves at length glabrate. *Leaves* 4–10 in., often as broad as long, rather rough to the touch; petiole 1–2 in.; stipules ovate, acute. *Flowers* densely tomentose, pedicels of ♂ very unequal. *Calyx-lobes* ¼ in. in flower, ½ in fruit, orbicular or broadly obovate. *Fruits*, the larger 2 in. long, broadly ovoid, obscurely angled; pericarp 1½ in. thick, dense, with a crustaceous shining lining; smaller globose, size of a cherry; placentas I think 2 only. *Seeds* small, black.

SECT. III. **Rothmannia.** Shrubs, unarmed. *Flowers* axillary (in the Indian species), solitary or fascicled; calyx-teeth linear. *Corolla* inflated.

14. **G. tentaculata,** *Hook.*; branches slender pubescent, leaves elliptic-lanceolate or oblanceolate caudate-acuminate membranous glabrous or puberulous beneath, flowers axillary polygamous, calyx-lobes filiform flexuous, corolla campanulate.

MALACCA, *Griffith, Maingay* (Kew Distrib. 2810, 839); foot of Mount Ophir, *Lobb.*

A shrub, unarmed. *Leaves* 4–9 by 1½–2½ in., sessile or narrowed into a very short petiole, dark green when dry; stipules ovate, acute, connate. *Flowers* in fascicles of 3–6; pedicels ¼–½ in., narrowly campanulate; limb dilated, with 5 spreading filiform curving pubescent teeth ⅓–⅔ in. long. *Corolla* ¾ in. long, glabrous; lobes ovate, obtuse. *Fruit* ½–⅔ in. long, broadly ellipsoid, crowned with the long tentacle-like calyx-teeth, smooth; pericarp thin, brittle, polished within; placentas 2. *Seeds* many, compressed.

DOUBTFUL AND EXCLUDED SPECIES.

G. IXORÆFOLIA, *Br. in Wall. Cat.* 8262; glabrous, unarmed, branches angled, leaves 4–7 by 1½–4 in. ovate- or linear-oblong obtuse very coriaceous narrowed to the base, nerves 10–12 pair very distant, petiole very short, fruit sessile broadly ovoid shortly beaked by the calyx-tube 1¾ in. long smooth, pericarp very thick polished within, placentas 2, seeds very broad and flat.—Tavoy, *Wallich.*—Perhaps a *Randia.*

G. CALYCULATA, *Roxb. Fl. Ind.* i. 704; "arboreous, leaves petioled ovate acuminate smooth, flowers terminal solitary sessile, germ involucelled, calycine segments ensiform, anthers within the swelling tube of the 5-cleft corolla." *DC. Prodr.* iv. 380; *W. & A. Prodr.* 396.—Native place uncertain, said to be brought from Hyderabad to Madras, where Roxburgh saw it in a garden. "Probably G. latifolia," W. & A.

G. ENNEANDRA, *Koen.*; *W. & A. Prodr.* 395; this differs from *G. latifolia*, Ait., in the very short obtuse calyx-teeth, and in the thin pericarp of the fruit. Under *G. latifolia* I have stated that Roxburgh's drawing and description of that plant differs from Aiton's in these points, but without more materials it is impossible to say whether this is to be regarded as a specific distinction.

G. CUNEATA, *Br.*; *Kurz For. Fl.* ii. 41: "a small glabrous tree, branches silvery, spines few solitary or paired 1–2 in., leaves subsessile obovate-cuneate obtuse thickly coriaceous, flowers 2–3-nate white turning yellow rather small, calyx puberulous, teeth 5 linear-lanceolate with a pair of minute ones in each sinus, corolla subrotate $\frac{1}{3}$ in. diam., tube as long as calyx, throat bearded, lobes obovate obtuse, fruit globose size of a wood-apple smooth."—Ava.

G. DASYCARPA, *Kurz For. Fl.* ii. 42; "a deciduous tree, spines straight sharp, soft parts villous pubescent, leaves 1–2 in. obovate-oblong obtuse or acute coriaceous retrorse-pubescent above, villous pubescent beneath, petiole very short, flowers solitary sessile on thick wart-like branchlets, fruit globose corticate size of a small apple velvety crowned with the tubular calyx-limb."—Forests of Upper Tenasserim; Prome, not unfrequent, *Kurz.*

G. PUBESCENS, *Roth Nov. Sp.* 151; *DC. Prodr.* iv. 383; *W. & A. Prodr.* 396; the description is insufficient to refer this to any genus, and, according to W. & A., it is certainly not a *Gardenia.*

G. CARINATA, *Thw. Enum.* 159 (C. P. 1655 in part); specimens imperfect, leaves sessile elliptic tips rounded, fruit ellipsoid obscurely 5-ribbed, endocarp rather thick woody, placentas 3.—Ceylon, Batticaloa, *Gardner.* This may be a form of *G. coronaria*, with 3 placentas and obscure ribs.

G. LATIFOLIA, *Thw. Enum.* 421 (C. P. 3617); this has the winged calyx-limb of *G. carinata*, but not so strongly, and the fruit is more globose; it may be a form of *G. latifolia* (the calyx being a very variable character).—Ceylon, near Colombo, *W. Ferguson.*

48.* HYPOBATHRUM, *Blume.*

49. PETUNGA, *DC.*

Glabrous shrubs; branches slender, strict, terete. *Leaves* petioled, narrowed at both ends; stipules triangular or oblong-ovate. *Flowers* small, in axillary spikes, 2-bracteolate, white. *Calyx-tube* ovoid; limb minute, 4-toothed, persistent. *Corolla* funnel-shaped, throat villous; lobes 4, spreading, twisted in bud. *Stamens* 4; anthers subsessile, linear, connective thickened at the tip. *Ovary* (often incompletely) 2-celled; style filiform, branches linear hairy; ovules 2–8, pendulous from the top of each cell. *Berry* small, 2-celled. *Seeds* imbricate; testa thick, grooved and plaited: cotyledons linear.—DISTRIB. 4 or 5, Bengal and Malay.

1. **P. Roxburghii,** *DC. Prodr.* iv. 399; stipules deciduous, spikes glabrous elongate, berry subglobose. P. microcarpa, *DC. l. c.* P. variabilis, *Hassk. in Flora,* 1845, 232. Higginsia microcarpa, *Blume Bijd.* 988. Spicillaria Leschenaultii, *A. Rich. in Mem. Hist. Nat. Paris,* v. 252. Randia racemosa *and* polysperma, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 525, 527. R. polysperma, *DC. l. c.* 389. Hypobathrum racemosum, *Kurz For. Flor.* ii. 51. Rubiacea, *Wall. Cat.* 8302, 8312.

EAST BENGAL (Suckshmee-poora), *Hamilton*; SILHET, *Wallich*; CHITTAGONG, *Roxburgh*; PEGU, *M'Clelland*; TENASSERIM and the NICOBAR ISLDS., in swamp forests, *Kurz,* &c.; MALACCA, *Griffith.*—DISTRIB. Java, Borneo.

An evergreen shrub, 3–8 ft. *Leaves* 2–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in., brown when dry, thinly coriaceous; petiole $\frac{1}{4}$ in.; stipules broad, caducous, with an axillary ring of brown hairs. *Spikes* sessile or short-peduncled, 1–2 in., erect spreading or recurved. *Flowers* $\frac{1}{8}$ in. long. *Berry* globose or shortly ellipsoid, pedicelled, orange yellow.—Griffith's Malacca specimen has smaller very shining leaves.

2. **P. longifolia,** *DC. Prodr.* iv. 399; stipules persistent, spikes densely pubescent very short. Higginsia longifolia, *Blume mss.*

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* This genus is introduced into the Key (p. 19) because it most probably occurs in the Malayan Peninsula, though it is as yet unrecorded.

PENANG, *Phillips, Wallich.*—DISTRIB. Java.

Leaves 5–8 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., brown when dry, caudate-acuminate; petiole $\frac{1}{4}$ in.; stipules broad, $\frac{1}{4}$ in. long, with a hairy keel; axils hairy as in *P. Roxburghii.* *Spikes* sessile or shortly-peduncled, $\frac{1}{2}$ in. *Fruit* not seen.—Leaves much longer, broader and more acuminate than in *P. Roxburghii*, and spikes very different.

3. **P. venulosa,** *Hook. f.*; stipules persistent, spikes elongate glabrous, berry pyriform. Randia venulosa, *Wall. Cat.* 8301.

PENANG and SINGAPORE, *Wallich, Griffith* (Kew Distrib. 2829); *Maingay* (911).

Leaves 5–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., caudate-acuminate, much more coriaceous than in *P. Roxburghii* and *longifolia*; petiole stout, $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., keeled, oblong-ovate. *Spikes* stout, 1–3 in., erect horizontal or deflexed. *Berry* $\frac{1}{3}$ in. long, on a pedicel of equal length.

50. MORINDOPSIS, *Hook. f.*

A small glabrous tree, branches rounded, ultimate compressed. *Leaves* subsessile; stipules broad, persistent. *Flowers* diœcious, small, white, in opposite supra-axillary peduncled heads, or ♀ rarely solitary. Fl. ♂: *calyx-tube* hemispheric, 4–5-toothed. *Corolla* shortly campanulate, throat villous; lobes 4–5, rounded, twisted in bud. *Anthers* 4–5, sessile, linear-oblong, acute. *Disk* hemispheric. *Style* with 2 erect hairy arms. Fl. ♀: *calyx-tube* oblong, 8-grooved; limb cupular, 4-lobed, hairy within. *Corolla* and *style* of the ♂. *Ovary* 2-celled; ovules many on peltate placentas. *Berry* elongate-oblong, 3-grooved, crowned by the calyx-limb, 2-celled, few- or many-seeded. *Seeds* imbricated downwards, ovoid, acute at both ends.

1. **M. capillaris,** *Kurz in Journ. As. Soc.* 1874, ii. 189; *For. Fl.* ii. 52. Psilobium capillare, *Kurz l. c.* 1872, ii. 313. Morinda, *Wall. Cat.* 8433, 8434.

PEGU and TENASSERIM, common, *Wallich*, &c.

An evergreen tree, 25 ft. *Leaves* 3–6 by 1–2 in., polymorphous, brown when dry, lanceolate oblong or elliptic, acute or acuminate, base acute rounded or subcordate; stipules ovate, acute. *Peduncles* of ♂ $\frac{1}{6}$–3 in., often capillary, often opposite; of ♀ 0 or very short, rarely long. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; ♂ fl. $\frac{1}{8}$ in.; ♀ larger; ovary urceolate, crowned with the triangular ciliate calyx-teeth. *Berry* 1 in.—Kurz, who must know this genus well, reduces all the forms to one; they differ, however, greatly in length, breadth, and shape of leaves, and in the length of the peduncles.

51. HYPTIANTHERA, *W. & A.*

A glabrous shrub, branches terete. *Leaves* shortly petioled; stipules triangular, persistent. *Flowers* small, white, sessile in axillary fascicles, bracteolate. *Calyx-tube* turbinate; lobes 5, acute, persistent. *Corolla-tube* short, hairy within; lobes 4–5, spreading, twisted in bud. *Anthers* 4–5, sessile, oblong, obtuse, pubescent at the base and back. *Disk* annular. *Ovary* 2-celled; style short, included, branches large long erect hispid; ovules 6–10 in each cell, pendulous from its apex. *Berry* ovoid or globose. *Seeds* pendulous, imbricated, compressed and angled, testa thick fibrous and plaited; embryo small.

1. **H. stricta,** *W. & A. Prodr.* 399; *Brand. For. Fl.* 274. Randia stricta, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 526; *DC. Prodr.* iv. 386. Macrocnemum strictum, *Willd. in Roem. & Sch. Syst.* v. 6. Rondeletia stricta, *Roth Nov. sp.* 140, *excl. syn.* Hypobathrum strictum, *Kurz For. Fl.* ii. 50. Rubiacea, *Wall. Cat.* 8138 *in part*, 8313, 8307.

NORTHERN INDIA and BENGAL, from Oudh to Birma, common, especially in E. Bengal, ascending the outer Himalaya and Khasia Mts. to 4000 ft.—DISTRIB. Ava.

A shrub or small tree, 5–10 ft., branching from the base, branchlets decussate. *Leaves* 3–9 by $\frac{1}{4}$–$1\frac{3}{4}$ in., lanceolate or ovate or linear-lanceolate, long-acuminate, coriaceous, glabrous or nerves beneath pubescent, brown when dry; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules triangular, persistent. *Flowers* $\frac{1}{6}$ in. long; bracts 2–3. *Berry* size of a pea.

52. NARGEDIA, *Beddome.*

A glabrous unarmed shrub. *Leaves* elliptic or lanceolate, acuminate; stipules triangular, acuminate, persistent. *Flowers* small, axillary, or supra-axillary, solitary or fascicled. *Calyx-tube* ovoid; limb short, irregularly 4–5-lobed. *Corolla-tube* short, cylindric, hairy within, longer than the 4–5 orbicular lobes, which are twisted in bud. *Anthers* 4–5, sessile, linear, glabrous. *Ovary* 2-celled; style short, stigma fusiform 2-cleft or -grooved; ovules 4 in each cell, pendulous from subapical placentas. *Fruit* pedicelled, nearly globose, 1-celled, 2–few-seeded. *Seeds* much compressed, testa ?, albumen deeply ruminate; cotyledons ovate, radicle slender.

1. **N. macrocarpa,** *Bedd. Fl. Sylv.* cxxxiv. t. 328. Hyptianthera macrocarpa, *Thw. Enum.* 157, 421.

CEYLON; Ambagamowa, and between Galle and Ratnapoora, *Walker, Thwaites.*

A shrub 8–10 ft. *Leaves* 5–8 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., rather coriaceous, brown when dry, nerves reticulate; petiole $\frac{1}{3}$ in. *Calyx-tube* rounded, apiculate. *Corolla-lobes* hairy down the middle. *Fruit* about 1 in. long, pedicelled. I have only imperfect specimens, and have taken the character of the fruit from Thwaites.

53. SCYPHOSTACHYS, *Thwaites.*

Erect shrubs, branches terete. *Leaves* short-petioled, linear- or oblong-lanceolate; stipules connate. *Flowers* small, in axillary or supra-axillary peduncled spikes, bracteate and with connate sheathing bracteoles. *Calyx-tube* short; limb produced, persistent, obtusely 4-lobed. *Corolla-tube* short, throat villous; lobes 4, short, recurved, twisted in bud. *Anthers* 4, subsessile, oblong. *Ovary* 2-celled; style short, branches short pilose; ovules about 4 in each cell, pendulous, placentas small on the septum. *Berry* ovoid or oblong, 1-celled, areolate. *Seeds* few, pendulous, ovoid, testa coriaceous grooved; embryo small, in fleshy albumen.—DISTRIB. Confined to Ceylon.

1. **S. pedunculatus,** *Thw. Enum.* 157; branches scabrous, stipules and bracteoles cuspidate striate hairy internally, corolla hairy externally.

CEYLON; at Pasdoon Corle, at no great elevation, *Thwaites.*

Leaves 3–6 by 1–$1\frac{1}{2}$ in., brown when dry, glabrous or pubescent on the nerves beneath; petiole short. *Peduncles* $\frac{1}{2}$–$\frac{3}{4}$ in. *Spike* like a small catkin, bracts 5–8, imbricate. *Fruit* $\frac{1}{2}$ in. long, ovoid, purplish-black. *Seed* usually solitary, linear-oblong.

2. **S. coffeoides,** *Thw. Enum.* 157; branches glabrous, stipules and bracts obtuse glabrous internally, corolla glabrous externally.

CEYLON; Ratnapoora district, at no great elevation, *Thwaites.*

Leaves 3–4 by $\frac{3}{4}$–$1\frac{1}{4}$ in., brown when dry, petiole very short; stipules ovate, scarious. *Peduncles* very short or 0. *Spikes* ovoid, few-flowered. *Berry* red. *Seeds* oblong, striate.

54. DIPLOSPORA, *DC.*

Evergreen shrubs or trees, branches terete. *Leaves* shortly petioled; stipules triangular, long pointed or acuminate. *Flowers* small in axillary fascicles or short cymes, polygamo-diœcious, white or greenish; bracts free or connate in a

cup. *Calyx-tube* short; limb truncate or 4–5-lobed or toothed. *Corolla-tube* short, cylindric or bell-shaped; lobes 4–5, spreading, twisted in bud. *Stamens* 4–5, filaments short or long; anthers oblong or linear, often recurved. *Ovary* 2- rarely 3-celled; style short or long, branches linear or oblong; ovules 2–3 in each cell, placentas on the septum. *Berry* ovoid or globose. *Seeds* few in each cell, imbricate, testa various; embryo small.—DISTRIB. Species 6 or 8 tropical Asiatic and Malayan.

SECT. I. **Eudiplospora.** *Bracteoles* connate, sheathing the pedicel and base of the ovary.

1. **D. singularis,** *Korth. in Ned. Kruidk. Arch.* ii. 201; glabrous, leaves elliptic or oblong acuminate, flowers fascicled, calyx deeply 4-lobed, fruit globose. *Kurz For. Fl.* ii. 50, *in part.* ? Vangueria palembanica, *Miq. Fl. Ind. Bat., Suppl.* 544. Rubiacea, *Wall. Cat.* 8299, 8321.

KHASIA MTS.; at Mamloo, alt. 3–4000 ft., *J. D. H. & T. T.* PEGU and TENASSERIM; Amherst, *Wallich.* Moolget, *Gallatly.*—DISTRIB. Sumatra, Banka, Borneo.

A small tree. *Leaves* pale when dry, 3–7 by 1½–2 in., coriaceous, shining; petiole short; stipules triangular, acute, tip not setaceous. *Pedicels* 3–4-nate, sheathed by the short imbricating bracts, which form a cup round them. *Calyx-teeth* enlarged after flowering. *Corolla-tube* ⅜ in., throat villous; lobes $\frac{1}{10}$ in., linear-oblong. *Fruit* ¾ in. diam., smooth, calyx-limb persistent; pericarp very thick. *Seeds* 8–10, broad much compressed.

SECT. II. **Discospermum.** *Bracteoles* very small, not sheathing, connate or free.

* *Stipules acuminate, point not long and setaceous.*

2. **D. apiocarpa,** *Dalz. in Hook. Kew Journ.* ii. 257, and in *Bomb. Fl.* 120 (Discospermum); glabrous, leaves ovate- or elliptic-lanceolate obtusely acuminate, calyx-limb truncate minutely 4-toothed, corolla-tube very short, fruit sessile ellipsoid subglobose or obovoid. Discospermum apiocarpum, *Bedd. Fl. Sylv.* t. 223; *Ic. Pl. Ind. Or.* t. 40.

WESTERN PENINSULA; on the Ghats from the Concan southwards, ascending to 5000 ft.

A small tree. *Leaves* pale when dry, 3–7 by 1½–3 in., coriaceous; petiole ½–¾ in.; stipules triangular, acuminate, tip not setaceous. *Flowers* fascicled, subsessile. *Corolla-tube* ⅛ in., throat glabrous, lobes oblong. *Stamens* in ♂ much exserted. *Fruit* ⅔ in. long, crown conical within the narrow calyx-limb. *Seeds* few.

3. **D. sphærocarpa,** *Dalz. in Hook. Kew Journ.* ii. 257, and in *Bomb. Fl.* 120 (Discospermum); glabrous, leaves elliptic-lanceolate obtuse or acute, calyx-limb 4-lobed, corolla-tube very short, fruit pedicelled globose. Discospermum sphærocarpum, *Bedd. Fl. Sylv., For. Man.* 134, 3, *excl. syn.*

WESTERN PENINSULA, or the Ghats from Bombay southwards.

A small tree. *Leaves* 2–6 by 1½–2½ in.; petiole ¼–½ in.; stipules short, acute, tip not setaceous. *Flowers* fascicled, shortly pedicelled. *Calyx-teeth* obtuse, ciliolate. *Corolla-tube* shorter than the calyx-teeth, throat glabrous, lobes ⅙ in. *Filaments* very short. *Fruit* ⅓ in. diam., calycine areole raised. *Seeds* few, vertically imbricate, much compressed.

4. **D. Dalzellii,** *Thw. Enum.* 158 (Discospermum); glabrous, leaves elliptic or elliptic-lanceolate obtuse, calyx-limb 4-lobed, corolla-tube of ♀ elongate cylindric, fruit globose subsessile.

CEYLON; central province, alt. 1–3000 ft.

Very similar to *D. sphærocarpa*, and reduced to it by Beddome (For. Man. 134, 3),

but the leaves are smaller and more obtuse, the corolla-tube of the female much longer, and the globose fruit has the pericarp thicker than the cell. Thwaites describes the fruit as 1 in. diam.; in the dried specimens it is $\frac{3}{8}$ in., and many-seeded.

5. **D. erythrospora,** *Thw. Enum.* 158 (Discospermum): glabrous, leaves obovate or elliptic, tip rounded or narrowed, calyx-limb truncate subentire, corolla-tube very short, fruit very small peduncled globose.

CEYLON; Ambagamowa district, alt. 5000 ft., *Thwaites.*

Leaves 3–5 by $1\frac{1}{2}$–2 in., greenish when dry, coriaceous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules triangular, acuminate. *Flowers* in small cymes; bracteoles minute, triangular. *Corolla* yellow, throat hairy, lobes oblong. *Filaments* of ♂ exserted. *Ovary-cells* each with 3–4 ovules. *Fruit* $\frac{1}{4}$ in. diam., pericarp thin. *Seeds* 1–5, compressed; testa red, thick.

6. **D. malaccense,** *Hook. f.*; glabrous, slender, leaves elliptic obtusely acuminate thinly coriaceous narrowed into the slender petiole, nerves 5–6 pair slender, flower ♂ clustered ♀ solitary shortly pedicelled, bracteoles 0, calyx-lobes 4 rounded.

MALACCA, *Griffith.*

Branches slender, pale brown. *Leaves* 3–4 by $1\frac{1}{2}$–2 in., pale brown when dry, paler beneath, opaque, veins obsolete; petiole $\frac{1}{4}$ in.; stipules triangular, acuminate. *Flowers* very small, ♂ sessile; ♀ shortly pedicelled, with 2 tubercles on the pedicel in the position of bracteoles. *Corolla-tube* funnel-shaped, rather longer than the glabrous lobes, hairy within. *Anthers* erect, sessile, exserted. *Style* of ♀ glabrous, thickened above the middle, arms rather long, stout. *Ovary* cells 2–3-ovuled.

** *Stipules with long setaceous points.*

7. **D. confusa,** *Hook. f.*; glabrous, leaves elliptic obtusely acuminate, flowers sessile in dense fascicles, stipules with long setaceous points, calyx truncate, corolla-tube very short, throat villous, fruit sessile. D. singularis, *Kurz For. Fl.* ii. 50, *in part.*

TENASSERIM; at Mergui, *Griffith* (Kew Distrib. 2798), *Kurz.*

An evergreen tree. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., pale when dry, opaque; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* almost capitate, very small. *Corolla-lobes* about equalling the tube. *Filaments* short. *Fruit* not seen.

8. **D. pubescens,** *Hook. f.*; branches petioles and nerves beneath pubescent, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate, stipules with long setaceous points, calyx obscurely 4-lobed, corolla-tube short, throat villous. ? *Wall. Cat.* 8297 *q. v.*

TENASSERIM; at Mergui, *Griffith, Helfer* (Kew Distrib. 2799).

Branches very slender. *Leaves* 5–8 by 2–3 in., pale when dry, base obtuse or rounded; petiole very short; stipules $\frac{1}{3}$ in. long, base triangular, gradually tapering to the bristle-like point. *Flowers* in small axillary heads, black when dry, as are the very young leaves. *Fruit* not seen.—A very distinct species.

9. **D. Griffithii,** *Hook. f.*; glabrous, leaves oblanceolate abruptly acuminate membranous, stipules with setaceous points, cymes subspicate, calyx obscurely toothed, corolla-throat glabrous.

BIRMA; near Tselow on the Irawaddi, *Griffith.*

A shrub 3 ft. high. *Leaves* 5–7 by $1\frac{3}{4}$–$2\frac{1}{4}$ in., pale greenish when dry, much narrowed into the short petiole; stipules deciduous. *Cymes* $\frac{1}{3}$–$\frac{2}{3}$ in., sometimes shortly peduncled, dense-flowered, glabrous; bracteoles minute, triangular. *Calyx* minute. *Corolla-tube* and lobes short. *Anthers* sessile. *Fruit* not seen.

10. **D. Kurzii,** *Hook. f.*; glabrous, leaves narrowly elliptic-lanceolate subcaudate-acuminate membranous, secondary nerves horizontal, stipules with setaceous points, flowers subcapitate minute, calyx calyculate, limb truncate, fruit small globose. Urophyllum biloculare, *Kurz in Journ. As. Soc.* 1872, ii. 313; *For. Fl.* ii. 53.

MARTABAN; in tropical forests, alt. 2–3000 ft., very rare, *Kurz.*

A small evergreen tree. *Leaves* 5–7 by 1½–2 in., pale greenish when dry, shining above, membranous; nerves arched, joined by the very slender horizontal veins; petiole very short; stipules connate, bases triangular, puberulous. *Flowers* in very slender clusters. *Calyx* puberulous. *Fruit* about ¼ in. diam., sessile, orange-coloured; pericarp thin; cells 3–4-seeded. *Seeds* rugulose on the back.—The veins are more regular and parallel than in any other species, recalling those of a *Urophyllum* or *Lasianthus.*

DOUBTFUL SPECIES.

D.?; Malacca, *Maingay* (*Kew Distrib.* 906, *Coffea*); glabrous, leaves elliptic 2–3 in. very opaque, nerves indistinct, stipules triangular acuminate, fruit sessile globose ⅓–⅔ in. diam., pericarp thick, cells 2- or more-seeded, seeds large much compressed.—Resembles a plant from the Buitenzorg garden in Java, marked *Canthium*? in the Calcutta Herbarium.

55. SCYPHIPHORA, *Gaertn.*

A glabrous tree, branches stout, nodose, terete, young gummy. *Leaves* coriaceous, obovate, obtuse; stipules broad. *Flowers* small, in dense shortly peduncled axillary cymes. *Calyx-tube* elongate-obconic; limb cupular, 4–5-toothed, persistent. *Corolla-tube* cylindric, throat dilated, hairy; lobes 4–5 oblong, twisted in bud. *Stamens* 4–5, filaments inserted between the lobes short subulate; anthers narrowly sagittate. *Disk* annular, lobed. *Ovary* with 2 narrow cells; style filiform, branches linear obtuse; ovules 2 in each cell, inserted on the middle of the septum, upper ascending, lower pendulous, funicles contiguous dividing the cell into two. *Drupe* subcylindric, 8–10-grooved and winged, with 2 crustaceous connate 4–5-ribbed pyrenes. *Seeds* subcylindric, testa membranous, albumen scanty; cotyledons oblong.

1. **S. hydrophyllacea,** *Gaertn. Fruct.* iii. 91, t. 196; *DC. Prodr.* iv. 577; *Kurz For. Fl.* ii. 4. Epithinia malayana, *Jack in Mal. Misc.* i. 12; *Wall. Cat.* 8444; *DC. l. c.* 478; *W. & A. Prodr.* 424. Epithinia sp., *Griff. Notul.* iv. 269; *Ic. Pl. Asiat.* 478 and 644 A. (Lumnitzera). Rubiacea, *Wall. Cat.* 9055, A. in part.

Mangrove swamps on the CARNATIC coast, *Wight*; MALAYAN PENINSULA, the ANDAMAN ISLANDS, and CEYLON.—DISTRIB. Malay Archipelago to N. Australia, Philippines, and New Caledonia.

A small evergreen tree; trunk short, simple; crown rounded. *Leaves* 2 by 1½ in., tip rounded, brown when dry, glossy, nerves few and inconspicuous; petiole ¼–⅓ in. *Flowers* subsessile, white or reddish. *Calyx* ⅙ in. *Corolla-tube* exceeding the calyx. *Drupe* ⅓ in. long.

56. JACKIA, *Wall.*

A lofty umbrageous tree; branches robust, 4-angled. *Leaves* intra-petiolar, broad, sheathing, ciliate, hairy within. *Flowers* spicate, recurved; spikes opposite, in long peduncled pendulous axillary cymes; bracts distichous, lower subfoliaceous often connate. *Calyx-tube* obconic, limb unilateral; lobes 5, spreading, with interposed teeth, at length foliaceous, coriaceous, veined, persistent. *Corolla* funnel-shaped, throat pubescent; lobes 5, plaited, lanceolate, cuspidate, valvate in bud. *Anthers* 5, subsessile in the throat. *Disk* hairy.

Ovary 2-celled; style capillary, exserted, thickened and hairy in the middle, branches 2 short narrow; ovules 2 in each cell, inserted on the top of a basilar erect placenta. *Fruit* dry, 2-celled, cells 1-seeded. *Seeds* unknown.

1. **J. ornata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 321; *Pl. As. Rar.* t. 293; *Cat.* 6284; *DC. Prodr. W.* 621.

MALACCA and SINGAPORE, *Wallich*, &c.

Branchlets as thick as the middle finger, and all young parts, the petiole, midrib, and inflorescence, rufous-tomentose. *Leaves* 5–18 in.; brown when dry, coriaceous, tip rounded, narrowed into the short robust petiole, shining above, hairy beneath or glabrate; stipules short, cylindric, coriaceous, bristles ½–1½ in. long. *Cymes* in slender peduncles 5–6 in. long; branches slender, spreading, primary opposite with sheathing stipular bracts; bracteoles broadly ovate, silky, imbricate. *Calyx-lobes* minute in flower, ½ in. long, oblong-lanceolate in fruit. *Corolla* ⅓ in., villous.

TRIBE VII. GUETTARDEÆ.

57. GUETTARDA, *Linn.*

Shrubs or trees. *Leaves* opposite or 3 in a whorl; stipules intra-petiolar, deciduous. *Flowers* secund on the branches of axillary forked peduncled usually opposite cymes. *Calyx-tube* short; limb tubular, toothed, usually deciduous. *Corolla-tube* long, cylindric, straight or curved, throat naked; lobes 4–9, oblong, imbricate in bud. *Anthers* 4–9, subsessile within the tube, linear. *Ovary* with 4–9 elongate cells; style filiform, stigma subcapitate; ovules solitary in each cell, pendulous, funicle thickened. *Drupe* globose or ovoid, endocarp 4–9-celled, and -grooved or -angled, perforated at the top opposite the cells, which are often displaced. *Seeds* pendulous, testa membranous, albumen scanty or 0; embryo slender.—DISTRIB. About 45 species, all but 1 American.

1. **G. speciosa,** *Linn.*; *DC. Prodr.* iv. 455; leaves broadly obovate base obtuse or cordate pubescent beneath, corolla silky. *Lamk. Ill.* t. 154, f. 2; *Roxb. Fl. Ind.* i. 686; *Wall. Cat.* 6219; *W. & A. Prodr.* 422; *Wt. Ic.* t. 40; *Bedd. Fl. Sylv. Anal. Gen.* t. 17, f. 2; *Kurz For. Fl.* ii. 37. Cadamba jasminiflora, *Sonner. Voy. Ind.* ii. t. 128. Nictanthes hirsuta, *Linn. Sp. Pl.* 8. Jasminum hirsutum, *Willd. Sp. Pl.* i. 36; *Rheede Hort. Mal.* t. 47, 48.

Littoral and tidal forests of the WESTERN and EASTERN PENINSULAS, the ANDAMAN ISLANDS, and CEYLON.—DISTRIB. Tropical shores of the old and new world.

A small evergreen polygamous tree; branchlets stout, short, petioles leaves beneath and usually inflorescence pubescent. *Leaves* 5–10 by 4–7 in., tip acute obtuse or rounded, green when dry; petiole 1–1½ in.; stipules ovate, pubescent, caducous. *Cymes* usually from the axils of fallen leaves, long-peduncled, with spreading dichotomous few-flowered branches. *Calyx* velvety, truncate. *Corolla* 1–1½ in., softly pubescent; limb 1 in. diam., segments obovate. *Drupe* woody, globose, obscurely lobed.—Roxburgh observes that he never met with hermaphrodite flowers.

58.* ANTIRRHÆA, *Comm.*

59. TIMONIUS, *Rumph.*

Shrubs or trees. *Leaves* opposite; stipules ovate-lanceolate, deciduous. *Flowers* polygamo-diœcious in axillary cymes; ♂ cymes with few or many-secund flowers, ♀ 1–3-flowered, pedicels 2-bracteolate. *Calyx-tube* short, limb

* This genus is introduced into the Key (p. 20) because a common Sumatran species probably occurs in the Malayan Peninsula, though hitherto unrecorded.

cupular, persistent. *Corolla* pubescent, coriaceous, funnel-shaped, glabrous within; lobes 4-5 (-10), valvate or slightly overlapping in bud. *Anthers* subsessile in the throat, linear. *Disk* hispid. *Ovary* 5-10-celled; style short, stout, hairy, branches 4-12, more or less combined; ovules solitary, pendulous in each cell, funicle thickened. *Drupe* ellipsoid, ovoid or globose; pyrenes 4-10, slender, erect or radiating outwards, or superposed. *Seeds* cylindric, testa membranous, albumen scanty or 0; embryo slender.—DISTRIB. Species about 20, tropical Asiatic and Oceanic.

1. **T. Jambosella,** *Thw. Enum.* 153; leaves elliptic-lanceolate acuminate minutely silky on the nerves beneath, ☿ solitary long-peduncled. *Bedd. Ic. Pl. Ind. Or.* t. 190. T. flavescens, *Baker Fl. Maurit.* 144. Nelitris Jambosella, *Gaertn. Fruct.* i. 134, t. 29, *excl. syn.* Heliospora flavescens, *Jack in Trans. Linn. Soc.* xiv. 127, t. 4, f. 3; *DC. Prodr.* iv. 391. Eupyrena glabra, *W. & A. Prodr.* 423. Bobea glabra, *Korth. in Ned. Kruidk. Arch.* ii. 211. Polyphragma flavescens, *Kurz For. Fl.* ii. 38. Guettarda? peduncularis, *Wall. Cat.* 6222; *Don Gen. Syst.* iii. 551. G. Brunonis *and* G. missiones, *Wall. Cat.* 6220, 6221.

ANDAMAN ISLANDS, MALAY PENINSULA, and CEYLON.—DISTRIB. Malay Archipelago, Mauritius.

A small evergreen tree; branches slender. *Leaves* 3-6 by 1-2½ in., brown when dry, coriaceous, nerves few; petiole ¼-¾ in.; stipules ⅓ in. *Cymes* ♂ long- or short-peduncled, 3-12-flowered, flowers sessile. *Calyx-tube* obscurely toothed; ☿ terminal on a stout peduncle, urn-shaped, campanulate in fruit. *Corolla* very variable, ⅙-½ in. long, silky-pubescent, lobes rounded. *Drupe* globose, ¼-⅓ in. long, rarely oblong, ribbed.—There may be more than one Indian species, but the plant is so variable that I am unable to decide. Wallich's *G.? Brunonis*, from Singapore, has very small leaves, and the ♂ cymes have spreading many-flowered branches. The Ceylon specimens have larger flowers than the Malayan.

2. **T. Rumphii,** *DC. Prodr.* iv. 461; leaves elliptic-lanceolate silky beneath. *Wall. Cat.* 6217. Bobea Wallichiana, *Korth. in Ned. Kruidk. Arch.* ii. 211.—*Rumph. Herb. Amb.* iii. 216, t. 140.

PENANG, MALACCA, and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Archipelago.

Very similar to *T. Jambosella*, but the ♂ cymes are usually shorter peduncled and smaller, and the leaves often very silky beneath. I have, however, great difficulty in distinguishing these species, and both seem to vary much in the pubescence of the leaves and size of flowers; the drupes are oblong or globose. Penang specimens from Maingay have small leaves, 2½-3 in., almost glabrous beneath, and ♂ fl. not ⅛ in. long; they have ellipsoid or globose berries, and may be a different species.

3. **T. Finlaysonianus,** *Wall. Cat.* 6223 (Guettarda); glabrate, leaves obovate or elliptic-oblong tip rounded or obtuse glabrous beneath. Timonius, *Wall. Cat.* 8446. Guettarda peduncularis, *Wall. Cat.* 6222, *in part.*

SINGAPORE, *Wallich, G. Thomson.*

Branches stout, glabrous. *Leaves* 3-5 in., narrowed into the very short petiole; midrib strong, red; nerves very slender. *Flower* ♂ not seen; ♀ solitary or 2-nate on pedicels ½-1½ in. *Drupe* globose, nearly ½ in. diam.—I doubt this being anything but a variety of *T. Jambosella*, though the form of the leaf is very different, the petiole shorter, and flower larger. The specimens of this genus in Wallich's Herbarium are much mixed. The sheet marked *Finlaysonianus* (6223) contains two specimens of what I think are different things (from Herb. Finlayson): one has small (2 in.) elliptic acute leaves, and long pedicelled quite glabrous ♂ flowers ½ in. long, fascicled on a very short peduncle, with a glabrous long-pedicelled young fruit from a lower axil; the other specimen has ♀ flowers only, solitary in the axils, a

glabrous ovary, and pubescent corolla. It is this latter I have described as *Finlaysonianus*; there is another specimen of it on the sheet with *T. Jambosella*, and it is also Wallich's 8446.

60. **DICHILANTHE**, *Thwaites*.

Trees with stout spreading branches, and resinous buds and nodes. *Leaves* rigid, elliptic-lanceolate, acuminate; stipules connate into a short intra-petiolar ring. *Flowers* small, sessile on a terminal sessile or peduncled orbicular receptacle formed of connate bracts. *Calyx-tube* elongate, curved; limb obliquely funnel-shaped, persistent; lobes 5, rigid, with toothed interposed segments. *Corolla* silky, funnel-shaped, tube curved, throat villous; limb 2-lipped, upper lip 2-, lower 3-toothed, lobes valvate in bud. *Stamens* 5, anthers included, oblong. *Disk* elevated, crenulate. *Ovary* with 2 narrow cells; style elongate, stout, stigma exserted clavate 2-lobed; ovules 1 pendulous in each cell, cylindric, funicle thickened. *Fruit* obovoid, gibbous, 2-celled, outer in each head incurved, pericarp thick. *Seeds* cylindric, albumen fleshy; radicle superior.—DISTRIB. Species 2, Ceylon and Borneo.

1. **D. zeylanica**, *Thw. in Hook. Kew Journ.* vii. 270, 376, t. 8. f. A. (*excl. stipules*); *H. f. & T. in Journ. Linn. Soc.* ii. 174; *Bedd. Fl. Sylv., Anal. Gen.* t. xv. f. 4.

CEYLON; between Galle and Ratnapoora, alt. 1000 ft., *Thwaites*.

A tree 30–40 ft. *Leaves* 4–6 by $1\frac{1}{2}$–2 in., glossy, red-brown when dry, finely reticulate, very coriaceous, narrowed into the stout short petiole. *Peduncles* very short; heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Calyx-lobes* $\frac{1}{6}$ in. *Corolla* $\frac{3}{4}$–$1\frac{1}{4}$ in. long, purplish.—The irregular flower is very anomalous, and resembles that of *Caprifoliaceæ*.

TRIBE VIII. **KNOXIEÆ.**

61. **KNOXIA**, *Linn.*

Erect herbs or undershrubs; stems terete or obtusely angled, with 2 lines of pubescence. *Leaves* opposite; stipules connate with the petiole into an entire or bristly sheath. *Flowers* dimorphous, pink or lilac, subsessile on the elongating branches of terminal cymes, rarely spicate. *Calyx-tube* ovoid or didymous; teeth 4, minute and subequal, or 1 or 2 elongate, persistent. *Corolla-tube* long, throat villous; lobes 4, valvate in bud with inflexed tips. *Stamens* 4, inserted within the throat; anthers linear, exserted or included. *Ovary* 2-celled; style filiform, stigma included or exserted 2-lobed; ovules 1 pendulous in each cell. *Fruit* very small, of 2 semi-terete or dorsally compressed indehiscent cocci. *Seeds* with a thickened funicle, testa membranous, albumen fleshy; embryo axile, cotyledons thin, radicle superior.—DISTRIB. Species 8 or 9, Indian, Malayan and Australian.

The synonymy of the Indian species is very confused, owing to the incomplete descriptions of the earlier authors. Some of the citations of De Candolle and Roxburgh may be open to question. Roxburgh's descriptions do not accord with his drawings.

* *Ripe fruit separating from the persistent subulate columella by a basal perforation; mericarps closely united, rarely separating.*

1. **K. corymbosa**, *Willd. Sp. Pl.* i. 582; pubescent villous or tomentose, leaves petioled or sessile linear- or ovate-lanceolate or oblong, stipular bristles hairy, cymes 3-chotomous, fruits spicate secund indehiscent perforate at the

base. *W. & A. Prodr.* 439; *Wt. Ill.* t. 128; *Dalz. & Gibs. Bomb. Fl.* 111. K. teres, *DC. Prodr.* iv. 569; *Wall. Cat.* 819, *in part.* K. exserta, *DC. l. c.* K. umbellata, *Banks*; *Spreng. Syst.* i. 406. K. sumatrensis, *Wall. Cat.* 6183. K. mollis, *Br. in Wall. Cat.* 820, *not of W. & A.* K. stricta, *Thw. Enum.* 152. Spermacoce? teres and S. exserta, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 367, 368; *ed. Carey & Wall.* i. 373, 374. S. sumatrensis, *Retz Obs.* iv. 23, *ex Cham. & Schl. in Linnæa*, iii. 316, *not of Roxb. Fl. Ind.* i. 366. ? Cuncea trifida, *Ham. in Don Prodr.* 135.

Throughout tropical India, from Garwhal in the WESTERN HIMALAYA, eastward to Sikkim, ascending to 5000 ft., and in the KHASIA MTS. to 4000 ft.; to CEYLON and MALACCA.—DISTRIB. Malay Archipelago and Tropical Australia.

An erect slender annual, 1–4 ft.; stem cylindric or obscurely 4-angled, sparingly 3-chotomously branched, internodes long. *Leaves* 3–5 by $\frac{1}{2}$–1 in., pale greenish or brown when dry, narrowed into the short petiole; stipular bristles $\frac{1}{5}$ in. *Flowers* $\frac{1}{10}$–$\frac{1}{8}$ in., very small, white or purplish. *Calyx-teeth* minute, triangular, subequal. *Corolla-tube* hairy within. *Fruit* $\frac{1}{16}$ in., sessile or shortly pedicelled, 4-angled.—I do not doubt this being the *Cuncea trifida* of Don's Prodromus, though the flowers are described as yellow and the fruit as a berry. Roxburgh's figure of *Spermacoce teres* differs from his description in the 2-partible fruit and plano-convex seed; he describes the seed of *S. teres* as round, which it should not be.

** *Ripe mericarps either connate, the fruit falling away as a whole with the central columella, or the mericarps separating from one another and falling away from the columella.*

† *Calyx-teeth all very small, equal or one rather larger than the rest.*

2. **K. mollis,** *W. & A. Prodr.* 439, *not of Br.*; pubescent villous or tomentose, leaves petioled rarely sessile ovate or lanceolate, stipules with hairy bristles, fruits crowded ellipsoid, mericarps connate and adnate to the columella. K. corymbosa, *Thw. Enum.* 151; *Schlecht. in Herb. Hohen. n.* 991. ? K. stricta, *Gaertn. Fruct.* i. 122, t. 25. K. teres, *Wall. Cat.* 819, *in part.*

Mountains of the WESTERN PENINSULA, from the Concan southwards, alt. 3–7000 ft. CEYLON, *Walker*; Hangalle, alt. 5000 ft., *Thwaites.*

An erect annual?, 1–3 ft., very variable in size; much more robust branched and leafy than *K. corymbosa*; branches 4-angled. *Leaves* 1$\frac{1}{2}$–5 by $\frac{1}{2}$–1$\frac{1}{2}$ in., brown when dry, with often rufous hairs; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Cymes* with short spreading branches; flowers crowded, blueish, $\frac{1}{8}$ in. long. *Fruits* smooth, terete, glabrous, $\frac{1}{12}$ in. long, black when dry, crowned with the rounded calyx-teeth.—In Ceylon specimens the petiole is 1 in. and very slender, in a specimen from Ritchie the leaves are quite sessile. Gaertner represents the mericarp of his *K. stricta* (from Ceylon) as separating and subacute dorsally, as in *K. zeylanica*, which has, however, very different calyx-teeth from Gaertner's figure.

3. **K. Heyneana,** *DC. Prodr.* iv. 570; glabrous or nearly so, leaves petioled ovate or linear-lanceolate, stipules with long rigid glabrous bristles, fruits racemose linear-oblong, mericarps separating. *W. & A. Prodr.* 440. Spermacoce corymbosa, *Roth Nov. Sp.* 98 (*ex. W. & A.*).

SOUTHERN MYSORE and CARNATIC; Dindygul Mts. and Courtallum, *Wight.*

Erect, leafy; branches robust, terete, shining. *Leaves* 2–3 by $\frac{3}{4}$–1$\frac{1}{4}$ in., rather coriaceous, brown when dry, acute or acuminate; stipular bristles stout, smooth, $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* puberulous, branches elongating after flowering as in *K. corymbosa*, but fruits pedicelled. *Fruit* pale, narrow, with a groove on each side where the mericarps separate.

4. **K. Wightiana,** *Wall. Cat.* 6184; glabrous, slender, leaves sessile linear obtuse recurved, stipules entire or 2–3-cleft, fruits few short didymous truncate, mericarps separating. *W. & A. Prodr.* 440.

NILGHIRI and SHEVAGHERRY HILLS, *Wight*, &c.

Rigid; stems 8–18 in., terete. *Leaves* 2–3 by ½ in., rigidly coriaceous, pale brown when dry, complicate; stipules erect, triangular-lanceolate, often quite entire. *Cyme-branches* puberulous or glabrous. *Fruits* apparently angled, somewhat laterally compressed, shortly pedicelled, as broad as long.

5. **K. brachycarpa,** *Br. in Wall. Cat.* 821; more or less pubescent, stem with 2 lines of pubescence, leaves sessile linear-oblong obtuse, stipules entire or 3- or more-cleft, cymes open or capitate, fruits short didymous truncate. K. macrocarpa, *Kurz in Journ. As. Soc.* 1877, ii. 138. K. lævis, *DC. Prodr.* iv. 570. Spermacoce Brunonis, *Wall. Cat.* 822. S. lævis, *Roxb. Hort. Beng.* 10, *Fl. Ind.* 1368; *Wt. Ic.* t. 193. S. Roxburghii, *Spreng. Syst.* i. 404.

TROPICAL HIMALAYA; Kumaon, alt. 3500–4000 ft., *Blinkworth*, &c.; Nepal, *Hamilton*. BEHAR; top of Parus-nath, alt. 4000 ft., *Anderson*. PEGU, *M'Clelland*; MARTABAN, *Kurz*.

An erect strict herb, 2–4 ft., internodes long; stem slender or robust; more or less hairy or glabrate, with always 2 more or less distinct lines of pubescence. *Leaves* 2–4 by ¼–¾ in., usually quite sessile and minutely pubescent on the margins and nerves beneath, more rarely elsewhere, base acute or rounded, pubescence of midrib continued down the stem; stipules pubescent, upper often entire. *Cymes*, if branched, main branches pubescent in 2 lines, the smaller puberulous; when capitate often tomentose; flowers small. *Calyx-teeth* very small, obtuse, one larger. *Fruit* as in *K. Wightiana*.—I suspect this to be Roxburgh's *Sp. lævis*; it is the only "interior of Bengal" plant at all answering to his description and drawing, from which it differs in the hairiness and large flowers. The Nipal and Bengal specimens have open cymes, the Kumaon ones globose terminal and sessile axillary heads, like *Hedyotis*; the Pegu ones have long brachiate branches with trichotomous terminal peduncles bearing capitate cymes at their ends.

†† *One or two calyx-lobes in fruit much elongate, subulate.*

6. **K. plantaginea,** *Wall. Pl. As. Rar.* 27, t. 32; *Cat.* 818; hirsute, subscapose, leaves sessile linear-oblong obtuse or subacute, stipular bristles very short or 0, flowers capitate, fruits racemose, mericarps keeled with 1 or 2 elongate calyx-teeth. *DC. Prodr.* iv. 570; *Kurz in Journ As. Soc.* 1877, ii. 138.

PEGU at Prome, *Wallich*; rare and sporadic, *Kurz*.

Rootstock thick, tortuous, woody, giving off short woody leafy branches, from which the very slender simple flower-bearing stems arise. *Leaves* on the stem 3–5 by ½–¾ in.; softly hairy on both surfaces, green when dry; stipules usually reduced to a truncate sheath. *Flowering stems* 10–16 in., softly hairy, each bearing one or two very distant pairs of small leaves 1 in. long, apparently without stipules, sparingly trichotomously branched at the tip, each branch bearing a head of flowers which elongates into a spike or raceme of distant fruits several inches long. *Calyx-teeth* subulate, one or two much elongate and exceeding the mericarps. *Corolla* ⅓ in. long, pale blue. *Fruit* (in Wallich's figure) ⅙ in., apparently flattened, with keeled mericarps, the elongated calyx-tooth often much exceeding the fruit.

7. **K. zeylanica,** *Linn.*; *DC. Prodr.* iv. 569; glabrous or glabrate, leaves shortly petioled ovate or ovate- or oblong-lanceolate, stipules entire or with nearly glabrous bristles, flowers capitate or spicate, fruits spicate, mericarps dorsally rounded and keeled. *Burm. Fl. Ind.* t. 13, f. 2; *A. Rich. in Mem. Soc. Hist. Nat. Par.* v. t. 15; *W. & A. Prodr.* 440, *excl. syn.* K. stricta.

CEYLON; common in the southern part of the island.

A small leafy rigid annual?; stem erect or ascending, and branches terete, smooth and scabrid above. *Leaves* 1–2 by ¼–⅓ in., narrowed at both ends, obtuse or subacute, margins recurved. *Spikes* and flowers glabrate or hispid, when fruiting sometimes 4 in. long and quite simple. *Corolla-tube* very slender. *Fruit* $\frac{1}{10}$ in., broadly ovoid, the long calyx-tooth equalling the mericarp, glabrous.

8. **K. platycarpa,** *Arn. Pugill.* 26; hirsute or glabrate, leaves ovate linear-oblong -ovate or -lanceolate, stipular bristles many hairy, cymes with short crowded branches but lengthening much in fruit, mericarps dorsally flattened and deeply keeled.

CEYLON; abundant in the central province, alt. 4–7000 ft.

According to Thwaites a very variable species, of which he distinguishes the three following forms, which look very unlike; all have short branched cymes and two forms of flowers, which are either hirsute glabrate or glabrous, and resemble those of *K. zeylanica*, but are often larger.

VAR. 1. *platycarpa*, Arn. l. c.; nearly glabrous, branches with two obscure lines of pubescence, leaves narrowly oblong-lanceolate ciliolate, stipular bristles short nearly glabrous.—Resembles in foliage *K. zeylanica*, and as the cyme branches frequently run out I suspect these species may prove the same.

VAR. 2. *hirsuta*, Thw. Enum. 152; hirsute or tomentose, leaves broader, stipular bristles longer and hirsute, cymes very dense, flowers larger usually very hirsute.—K. hirsuta, *Arn. l. c.*

VAR. 3. *foliosa*, Thw. l. c.; hirsute or glabrate, branches very stout, leaves more coriaceous broadly ovate, stipular bristles very rigid, large calycine lobe sometimes foliaceous.

DOUBTFUL SPECIES.

K. SUMATRENSIS, *DC. Prodr.* iv. 569, from the Circars;—it is impossible to say to what this refers. Roxburgh's *Spermacoce sumatrensis* (which is referred to it) is described as having the corolla with a broad gibbous tube, and a 2-valved capsule 2-partible from the base; it is probably a *Hedyotis*.

TRIBE IX. ALBERTEÆ.

62. OCTOTROPIS, *Bedd.*

A glabrous shrub; branches slender. *Leaves* elliptic-lanceolate, caudate-acuminate, membranous; stipules triangular, persistent. *Flowers* in peduncled axillary or supra-axillary corymbose cymes. *Calyx-tube* turbinate, 5-toothed. *Corolla* campanulate, tube short, throat villous; lobes 5, ovate, acute, twisted in bud. *Anthers* 5, sessile on the mouth of the corolla, linear, cuspidate, base 2-fid, exserted. *Disk* small. *Ovary* 1-celled; style stout, pubescent, 8-ribbed; arms 2, short, acute, glabrous; ovules solitary or a pair pendulous from the top of the cell. *Fruit* ovoid, smooth, coriaceous, 1-seeded. *Seed* oblong, pendulous.

1. **O. travancorica,** *Beddome Fl. Sylv.* t. 327; *For. Man.* 134/12.

TRAVANCORE, alt. 3–3500 ft.; Shevagherry hills, *Wight*, *Beddome*.

Leaves 3½–5 in.; petiole ¼ in. *Peduncles* capillary, half as long as the leaves; cyme-branches opposite; bracts small; flowers ½ in. diam., shortly pedicelled, 2-bracteolate.—A very singular genus, belonging to an otherwise exclusively African tribe. *Octotropis* is further unique in the Order, in having a 1-celled ovary with 1 or 2 pendulous ovules. Specimens of this in Wight's Herbarium are fastened on a sheet with a *Canthium*.

TRIBE X. VANGUERIEÆ.

63. CANTHIUM, *Lam.*

(PLECTRONIA, *Linn. in part.*)

Unarmed or spinous shrubs, erect or climbing; branches terete. *Leaves* opposite; stipules connate. *Flowers* small, axillary, fascicled or in peduncled corymbose cymes, white or greenish, sometimes polygamous. *Calyx-tube* short; limb very short, persistent or deciduous, 4–5-toothed. *Corolla-tube* funnel-

shaped, campanulate, globose or urceolate, with a ring of deflexed hairs within; throat villous; lobes 4–5, at length reflexed, valvate in bud. *Anthers* 4–5, subsessile on the throat or mouth of the corolla. *Ovary* 2-celled; style stout, stigma large; ovules 1 pendulous in each cell. *Drupe* didymous or subglobose, or with one carpel suppressed then reniform or oblong, with 1–2 pyrenes or a 2-celled putamen. *Seeds* oblong, testa membranous, albumen fleshy; embryo long, with short cotyledons.—DISTRIB. About 70 species, in the tropics of the old world.

* *Unarmed, flowers 5-merous.*

1. **C. didymum,** *Roxb. Fl. Ind.* i. 535; unarmed, glabrous, leaves ovate lanceolate or suborbicular, cymes compressed shortly peduncled, bracts short or 0, flowers 5-merous, fruit $\frac{1}{4}$–$\frac{1}{3}$ in. globose ellipsoid or obovoid compressed subdidymous, putamen rugose. *Roxb. Fl. Ind.* i. 535; *W. & A. Prodr.* 425; *DC. Prodr.* iv. 473; *Wall. Cat.* 8413 *excl.* A. Plectronia didyma, *Kurz For. Fl.* ii. 35. Psydrax dicoccos, *Gaertn. Fruct.* t. 26; *DC. l. c.* 476. Vangueria spirostylis *and* lucidula, *Miq. Fl. Ind. Bat.* ii. 250, *and suppl.* 544 (*fid. Kurz*). Indeterm., *Wall. Cat.* 9069.

SIKKIM HIMALAYA, alt. 1,500 ft., at Sittong, *King*; KHASIA and JYNTEA MTS., *De Silva*; WESTERN PENINSULA, from the Concan southwards; MALAYAN PENINSULA, from Mergui southwards; CEYLON, common.—DISTRIB. Malay Archip., S. China.

A stout evergreen shrub; branches smooth. *Leaves* very variable, 2–6 by $\frac{1}{2}$–4 in., very coriaceous, polished above, usually obtusely caudate-acuminate, base acute obtuse or even cordate, nerve-axils eglandular; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Cymes* subsessile or on a short peduncle, $\frac{1}{4}$–1 in., sometimes puberulous. *Calyx* truncate or obscurely toothed. *Corolla* campanulate, tube $\frac{1}{10}$–$\frac{1}{4}$ in.; lobes 5, subacute. *Style* glabrous; stigma subquadrate, notched or 2-fid. *Fruit* very variable.—Thwaites' var. *rostrata* is founded on the rostrate (that is caudate-acuminate) leaves, which, however, do not differ from those of a common Eastern or Western form; it has also often beaked elongate fruits, the result of insect injury.

VAR. *lanceolata*, Thw. mss.; leaves narrowly elliptic-lanceolate obtuse 4–5 by $\frac{3}{4}$–1$\frac{1}{4}$ in. Canthium lanceolatum, *Arn. Pugill.* 24. Webera lanceolata, *Moon. Cat.* 19.—Ceylon, *Thwaites*.—Amongst Wight's duplicates (Kew Distrib. 1414) are specimens marked from Courtallam, but as none such are in Wight's own Herbarium I suspect some mistake.

VAR. *grandifolia*, Thw. Enum. 152; leaves very large 6–8 by 3–4 in., base rounded. Ceylon.

VAR. *Kingii*; leaves more membranous elliptic-lanceolate very finely acuminate, cymes deflexed corymbiform, flowers large, corolla-tube $\frac{1}{3}$ in. quite glabrous.—Sikkim, *Dr. King*.—This may prove a different species, but in the absence of fruit this is uncertain.

2. **C. montanum,** *Thw. Enum.* 152; unarmed, glabrous, leaves small orbicular or ovate obtuse, cymes shortly peduncled subumbellate, flowers 5-merous.

CEYLON; central province, alt. 4–7000 ft., *Thwaites*.

Probably, as Thwaites suspects, a small-leaved form of *C. didymum*. The fruit is unknown.

3. **C. umbellatum,** *Wight Ic.* t. 1034; unarmed, glabrous, leaves elliptic obtuse or obtusely acuminate, flowers umbellate on a short very stout compressed peduncle, flowers 5-merous, fruit $\frac{1}{4}$–$\frac{1}{3}$ in. broad oblong or subquadrate didymous, putamen rugose. *Dalz. & Gibs. Bomb. Fl.* 113 (*not of Korth.*). C. didymum, *Bedd. Fl. Sylv.* t. 221; *Wall. Cat.* 8413 A. C. lucidum, *Schlecht in Pl. Hohen.* n. 1377. Plectronia didyma, *Brand. For. Fl.* 276. Rubiacea, *Wall. Cat.* 8451, 8452.

WESTERN PENINSULA, on the Ghats, alt. 4–8000 ft., from the Concan southwards. TENASSERIM, *Wallich, Helfer* (Kew Distrib. 2972); AVA, *Wallich.*

An evergreen tree, 50 ft. *Leaves* very coriaceous, similar to the ordinary form of *C. didymum*, of which this is probably a variety. Korthal's *C. umbellatum*, with a slender peduncle, is a very different plant.

4. **C. neilgherrense,** *Wight Ic.* t. 1064 *bis*; unarmed, leaves elliptic-ovate obtuse glabrous or setose beneath, flowers 5-merous, pedicels very short axillary fascicled, fruits obovoid or obcordate compressed subdidymous, putamen smooth. *Bedd. Fl. Sylv.* t. 221 A.; *For. Man.* 134, 6 (Plectronia).

NILGHERRY and PULNEY MTS., *Wight, G. Thomson.*

An evergreen shrub or tree; branches opposite, glabrous. *Leaves* $3\frac{1}{2}$–$4\frac{1}{2}$ by $1\frac{1}{4}$–2 in., rather coriaceous, dark green or black when dry; peticle $\frac{1}{8}$–$\frac{1}{6}$ in. *Flowers* shortly pedicelled, sometimes on a very short peduncle; pedicels $\frac{1}{6}$–$\frac{1}{2}$ in. *Fruit* nearly $\frac{3}{4}$ in.; pericarp thin.

VAR. 1; leaves coriaceous glabrous, stipules $\frac{1}{3}$–$\frac{1}{2}$ in.—Nilgherrys, *Wight* (Kew Distrib. 1424, 1425).

VAR. 2; leaves less coriaceous hirsute beneath or covered with scattered rigid hairs, stipules small.—Pulney Mts. (Kew Distrib. 1422, 1426).

5. **C. ficiforme,** *Hook. f.*; unarmed, glabrous, leaves elliptic obtusely acuminate, flowers 5-merous fascicled on a very short peduncle, fruit very large pyriform stoutly pedicelled, putamen thick woody very deeply sinuously grooved.

MYSORE; Shevagherry hills, *Wight.*

Branches very stout, and leaves almost black when dry. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., very thickly coriaceous, narrowed into a very stout petiole; nerves oblique, slender; stipules short, broad. *Peduncles* $\frac{1}{2}$ in. or less, sometimes branched; pedicels as long. *Fruit* 1–$1\frac{1}{4}$ in., somewhat compressed, narrowed into a pedicel $\frac{1}{2}$ in. long; putamen resembling a small walnut.

6. **C. glabrum,** *Blume Bijd.* 967; unarmed, glabrous, leaves large ovate subacute, cymes small compressed shortly peduncled, flowers 5-merous, fruit large ellipsoid or subovoid with 2 very smooth 3-gonous pyrenes. *DC. Prodr.* iv. 474; *Kurz For. Fl.* ii. 35 (Plectronia). Vangueria ? atroviridis, *Wall. Cat.* 8412. Rubiacea, *Wall. Cat.* 8303.

From TENASSERIM, PEGU, and the ANDAMAN ISLANDS, to SINGAPORE and PENANG, *Wallich*, &c., *Maingay* (Kew Distrib. 863).—DISTRIB. Java.

A small tree; branches stout, upper compressed. *Leaves* 4–6 by $1\frac{1}{2}$–3 in., dull green when dry, thinly coriaceous; nerves few, distant; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules short. *Cymes* with short spreading branches; flowers small, shortly peduncled. *Corolla-tube* subglobose, $\frac{1}{12}$ in.; lobes as long. *Stigma* mitriform, notched. *Fruit* $\frac{2}{3}$–1 in. long; pyrenes abruptly narrowed and compressed parallel to the ventral face at the top.

7. **C. confertum,** *Korth. in Ned. Kruidk. Arch.* ii. 235; unarmed, glabrous, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate, flowers fascicled shortly pedicelled 5-merous, fruit small obovoid or obcordate subcompressed, putamen woody rugose. C. glomerulatum, *Miq. Fl. Ind. Bat., suppl.* 585. Memecylon pauciflorum, *Wall. Cat.* 4114.

PENANG, SINGAPORE, and MALACCA, *Wallich, Griffith* (Kew Distrib. 2973), *Maingay* (862, 942).—DISTRIB. Malay Archipelago.

Branches slender. *Leaves* 3–5 by $\frac{3}{4}$–2 in., dull green when dry, opaque, coriaceous; nerves slender; petiole and stipules short. *Flowers* small, often unisexual; buds obtuse; pedicel $\frac{1}{10}$–$\frac{1}{6}$ in. *Corolla-tube* and lobes very short. *Style* glabrous. *Fruit* $\frac{1}{4}$

in. long.—Miquel says the flowers are 4–5-merous; all other authors say 5-merous, as I find them.

** *Unarmed; flowers 4-merous.*

8. **C. travancoricum,** *Bedd. Ic. Pl. Ind. Or.* t. 239; unarmed, glabrous, leaves long-petioled ovate obtusely acuminate, cymes long-peduncled, branches slender.

TRAVANCORE and TINEVELLY hills; Beddome.

A tree; branchlets woody with rough bark. *Leaves* clustered on short lateral shoots, 1½–2 in., bright green beneath when dry; petiole very slender. ½ in.; stipules triangular with long subulate points. *Peduncle* of cyme sometimes 1 in., stout and compressed, or shorter or 0; branches very slender. *Flowers* very small, $\frac{1}{10}$ in. diam. *Calyx-teeth* subulate. *Corolla-tube* shortly campanulate. *Stigma* capitate. *Fruit* unknown.

9. **C. gracilipes,** *Kurz in Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 36 (Canthium); unarmed, short petioles and nerves beneath puberulous, leaves elliptic obtusely acuminate, flowers 4-merous solitary or in pairs, pedicels capillary, fruit subquadrately didymous or reniform, pyrenes rugose thinly woody remote.

ANDAMAN ISLANDS; rather frequent, *Kurz.*

Shrubby; pubescence fulvous; branches slender. *Leaves* 3–5 by 1¼–2 in., green when dry, membranous; nerves very slender; petiole very short; stipules finely acuminate. *Flowers* very small; pedicels ½–⅔ in., hairy, arising from very short shoots. *Calyx-teeth* subulate. *Fruit* ½ in. across, with a very broad sinus at top, blueish-black.

*** *Armed; stamens 4 or 5.*

10. **C. puberulum,** *Thw. mss.*; spinescent, pubescent, leaves small elliptic acute, peduncles fascicled, flowers 4–5-merous, calyx-lobes long recurved, corolla-tube broadly campanulate.

CEYLON; central province, *Thwaites* (C. P. 3995).

Branches slender, elongate; spines short, straight. *Leaves* ¾–1 in., bright green when dry, finely pubescent on both surfaces; petiole short; stipules with slender points. *Peduncles* always bracteate, 1–3-flowered, ⅓–½ in., fulvous pubescent, as are the bracts and calyx. *Calyx-tube* campanulate; lobes longer than the corolla, narrowly lanceolate. *Corolla-tube* $\frac{1}{12}$ in., lobes acute. *Style* glabrous; stigma subglobose. *Fruit* unknown.

11. **C. Rheedii,** *DC. Prodr.* iv. 474; spinescent, shining, branches divaricate, leaves ovate obtusely caudate-acuminate, petiole and very short fascicled pedicels pubescent, flowers 5-merous, fruit suborbicular compressed. *W. & A. Prodr.* 426; *Dalz. & Gibs. Bomb. Fl.* 113. Webera tetrandra, *Wall. Cat.* 8265 A. *in part*; *Rheede Hort. Mal.* v. t. 37.

WESTERN PENINSULA; from the Concan southwards. CEYLON; southern and central part.

Shrubby, "scandent" (Dalzell); branches slender, short, pubescent; spines short, slightly recurved. *Leaves* 1–4½ by 1–2 in., dark brown or black when dry, rarely green; base rounded, sometimes acute or cordate; nerve-axils sometimes hairy; petiole very short and triangular; stipules appressed, hairy. *Pedicels* ⅛–⅙ in., shorter than the flowers. *Calyx-teeth* minute. *Corolla-tube* very short and broad; lobes lanceolate, acuminate, forming a long beak in bud, glabrous. *Style* hairy. *Fruit* ⅓ in. diam., subdidymous, truncate with a broad sinus above; pyrenes crustaceous, contiguous.—Wight & Arnott (Prodr. 427) have a var. β with the under surface of the leaves sprinkled with hairs, and a var. γ with cordate base to the leaves. Thwaites makes a var. δ *minus* for a very small-leaved form with straight ascending spines.

12. **C. angustifolium,** *Roxb. Fl. Ind.* i. 533; spinescent, branches divaricate, leaves ovate or elliptic-lanceolate obtusely caudate-acuminate, petioles and very short fascicled pedicels glabrous, flowers 5-merous, fruit suborbicular compressed. *DC. Prodr.* iv. 474. C. Leschenaultii, *W. & A. Prodr.* 426; *Wt. Ic.* t. 826; *Dalz. & Gibs. Bomb. Fl.* 113; *Wall. Cat.* 8414. Dondisia Leschenaultii, *DC. l. c.* 469. Rubiacea, *Wall. Cat.* 8308.—*Rheede Hort. Mal.* vii. t. 17.

WESTERN PENINSULA, on the coast and hills from Belgaum southwards; the SUNDERBUNDS, SILHET, and CHITTAGONG, *Roxburgh*, &c.

Very near indeed to *C. Rheedii*, and I expect only a glabrous variety; the fruit and flowers are the same. I find traces of pubescence in the shoots of Bengal specimens.

13. **C. macrocarpum,** *Thw. Enum.* 152; spinescent, pubescent, leaves ovate or elliptic-lanceolate acuminate, cymes shortly peduncled, flowers 5-merous pedicelled, fruit large subglobose, putamen very thick and bony undulate externally rugose internally.

CEYLON; Hantani, alt. 3000 ft., *Thwaites.*

A subscandent shrub; short petioles and nerves rufous-tomentose. *Leaves* 2–3 in., dull green when dry, base rounded; petiole $\frac{1}{6}$ in.; stipules minute. *Cyme* subumbellately branched, pubescent; peduncles about $\frac{3}{4}$ in., pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* 5-toothed. *Corolla* dirty white; lobes lanceolate, rather longer than the tube. *Fruit* 1 in., usually irregular in form, only one carpel maturing.—I have seen no flowers, nor spines.

14. **C. campanulatum,** *Thw. Enum.* 153; spinescent, glabrous, leaves small ovate or elliptic obtuse, pedicels 1–4 slender, flowers 5-merous, corolla campanulate. *Bedd. Fl. Sylv., For. Man.* 134/6.

CEYLON; Deltotte, in the central province, alt. 3000 ft., *Thwaites.*

A subscandent shrub; branches slender, rough, youngest scaberulous; spines small, straight. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ in., green when dry, coriaceous; petiole $\frac{1}{10}$ in.; stipules minute. *Pedicels* $\frac{1}{2}$ in.; flowers quite glabrous. *Calyx-lobes* short, acute. *Corolla* $\frac{1}{3}$ in. diam., tube shorter than the acuminate lobes. *Stigma* obconic with a truncate base, entire. *Fruit* the size of a pea (not seen by me).

15. **C. parvifolium,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 534; spines straight, branches slender and petioles and leaves beneath or on both surfaces hirsute, leaves small ovate or elliptic subacute, flowers 5-merous subsessile, fruit small suborbicular compressed, putamen tubercled. *DC. Prodr.* iv. 474. C. scandens, *Blume Bijd.* 966; *DC. l. c.* 475. Rubiacea, *Wall. Cat.* 8288 B. Gardenia rigida, *Wall. Cat.* 8257 *in part.*

BEHAR; Monghir, *Hamilton.* KHASIA MTS., alt. 2–3000 ft., *J. D. H. & T. T.*, *C. B. Clarke.* CHITTAGONG, *Wallich, J. D. H. & T. T.* PEGU, *Kurz.*—DISTRIB. Malayan Archipelago, S. China.

A rambling shrub with spreading slender pubescent or hirsute branches; spines slender, supra-axillary. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., green when dry; petiole very short; stipules ovate-lanceolate. *Calyx* minutely 5-toothed. *Corolla-tube* subglobose, glabrous; teeth lanceolate, acute. *Disk* villous. *Fruit* $\frac{1}{3}$ in. diam., like that of *C. Rheedii.*

16. **C. horridum,** *Blume Bijd.* 966; spines hooked, branches slender petioles and leaves beneath pubescent or hirsute, leaves small ovate subacute, flowers 5-merous subsessile, fruit large subglobose. *DC. Prodr.* iv. 474; *Kurz For. Fl.* ii. 36 (Plectronia). C. zizyphinum, *Wall. Cat.* 8288 A. C. Hyptianthera rhamnoides, *Morr. & Zoll. Syst. Verh.* 60. Dondisia horrida, *Korth. in Ned. Kruidk. Arch.* ii. 236.

TENASSERIM, *Gomez*; SINGAPORE and PENANG, *Wallich*, &c.—DISTRIB. Malay Archipelago, Philippine Islands.

Differs from *C. parvifolium* only in the shorter hooked compressed spines and much

larger fruit, which I have not seen, but which is described by Kurz as equalling a small cherry.

17. **C. parviflorum,** *Lamk. Dict.* i. 602; spinescent, glabrous, leaves small ovate obovate or orbicular obtuse, cymes peduncled many-flowered, flowers 4-merous, fruit suborbicular compressed emarginate at both ends, endocarp woody undulate. *DC. Prodr.* iv. 474; *Gaertn. f. Fruct.* t. 196, f. 3; *Roxb. Cor. Pl.* t. 57; *Fl. Ind.* i. 534; *W. & A. Prodr.* 426; *Dalz. & Gibs. Bomb. Fl.* 113; *Wall. Cat.* 8289. Webera tetrandra, *Willd. Sp. Pl.* i. 1224 *excl. syn. Rheede*; *Wall. Cat.* 8265 *in part.*—*Rheede Hort. Mal.* v. t. 36.

WESTERN PENINSULA; from the Concan southwards. CEYLON; abundant up to 4000 ft.

A rigid shrub; branches often thickly covered with stout straight spines 1–2 in. long. *Leaves* usually crowded on shortened lateral shoots, ½–1 in., rather coriaceous, dirty green when dry, opaque, base cuneate; petiole slender, $\frac{1}{10}$–¼ in.; stipules small with long cuspidate points. *Cymes* ¼–¾ in.; peduncle and pedicel slender, short or long; flowers very small, yellowish. *Calyx-teeth* minute. *Corolla-tube* subglobose; lobes ovate. *Style* glabrous, stigma capitate. *Fruit* subquadrate or obcordate subdidymous, ½ in. diam.—"Spines sometimes three-fold" (Roxburgh).

64. VANGUERIA, *Juss.*

Characters of *Canthium*, but ovary 3-6- (usually 5-) celled, and fruit larger. —DISTRIB. Species about 30, in the tropics of the old world.

V. EDULIS, *Vahl* (*Wall. Cat.* 8410), a native of Madagascar, a small tree resembling *V. spinosa*, but unarmed, is cultivated in India for the sake of its eatable fruit.

1. **V. spinosa,** *Roxb. Fl. Ind.* i. 536; spinescent, leaves glabrous villous or tomentose. *Wall. Cat.* 8409; *DC. Prodr.* iv. 454. V. mollis, *Wall. Cat.* 8411. V. spinosa *and* V. pubescens, *Kurz For. Fl.* ii. 34. V. edulis, *Miq. in Herb. Hohenack.* n. 127, *not of Vahl.* Pyrostria? spinosa, *Miq. Fl. Ind. Bat.* ii. 313. Canthium, *Wall. Cat.* 8415, 8417.

From NORTHERN BENGAL to CANARA, PEGU, TENASSERIM, and BIRMA.—DISTRIB. Java.

A small tree or large bush, with straight opposite simple or 3-nate spines. *Leaves* 3–4 in., opposite or 3-nately whorled, ovate or oblong, acute or acuminate; petiole ⅛–1 in.; stipules cuspidate from a broad base. *Cymes* 1–1½ in., shortly peduncled; flowers greenish, pedicelled. *Calyx* 5-toothed. *Corolla-tube* subglobose; lobes triangular, acute. *Style* glabrous; stigma 4–5-lobed. *Drupe* ¾ in. diam., subglobose or turbinate, smooth, fleshy; pyrenes 4–5, woody, smooth.—Fruit eatable.

VAR. 1. *spinosa proper*; leaves glabrous or nearly so. V. spinosa, *Roxb.*

VAR. 2. *mollis*, Wall. Cat. 8411 (sp.); leaves more or less pubescent or tomentose on both surfaces. V. pubescens, *Kurz.*

65. MESOPTERA, *Hook. f.*

A tree; branches robust, terete. *Leaves* opposite, petioled, large and broad, very coriaceous, tomentose beneath; nerves strong; stipules large, rigidly coriaceous, interpetiolar, one much larger than the other, obliquely oblong, very obtuse, with strong parallel or subflabellate nerves, the other shorter, rounded. *Flowers* minute, in small dense axillary cymes, ebracteolate. *Calyx-tube* short, hemispheric, 5-toothed. *Corolla-tube* short; throat hairy; lobes 5, short, acute, valvate in bud. *Stamens* 5, on the corolla-throat; filaments short subulate; anthers oblong, apiculate. *Ovary* 2-celled; style short, stout, stigma capitate 10-lobed; ovules 1 in each cell, attached to the septum, amphitropous? *Fruit* small, 2-celled, didymous (or 1-celled and globose), smooth; pericarp coriaceous with a thin fleshy covering. *Seeds* cup-shaped, embracing a thick horny projection from the middle of the inner angle of the cell, testa adnate to the dense

fleshy albumen; embryo slender, cylindric, occupying the whole axis of the albumen, hence coiled almost in a circle, cotyledons very short obtuse, radicle very long superior.

1. **M. Maingayi,** *Hook. f. in Gen. Plant.* ii. 131.

MALACCA, *Maingay* (Kew Distrib. 939).

Branches as thick as a goose-quill. *Leaves* 8–12 by 4–5 in., ovate or elliptic, acuminate, brown when dry, glabrous and shining above, rusty beneath; nerves 9–10 pair, impressed above; petiole ½ in., very stout; larger stipule 1 in. *Cymes* small and dense in flower, open in fruit, much branched, hirsute, branches slender. *Fruit* when didymous ⅓ in. diam., black when dry.—The description of the flowers is aided by Maingay's mss., where the ovules are described as inserted near the base of the cell, whence I assumed the plant to belong to *Psychotriæ*, and so classed it in the Genera Plantarum; the fruit, then unknown, shows it to belong to *Vanguerieæ*, though it resembles more outwardly that of an *Ixora*.

TRIBE XI. **IXOREÆ.**

66. **IXORA,** *Linn.*

Shrubs or small trees; branches terete. *Leaves* opposite, rarely in threes; stipules interpetiolar. *Flowers* in terminal 3-chotomously branched often corymbiform cymes, 2-bracteolate, very rarely 5-merous. *Calyx-tube* ovoid; limb 4-toothed, persistent. *Corolla-tube* long, very slender; lobes 4, spreading, twisted in bud. *Stamens* 4, on the mouth of the corolla; filaments short or 0, rarely half as long as the anther; anther slender, tip often mucronate, base 2-fid. *Ovary* 2-celled; style filiform, exserted, never twice as long as the corolla-tube; stigma slender, fusiform; branches 2, rarely persistently connate; ovules solitary, peltately attached to the septum in each cell. *Fruit* globose or didymous with 2 plano-convex or ventrally concave coriaceous pyrenes. *Seeds* peltate, testa membranous, albumen horny; cotyledons flat thin, radicle inferior.—DISTRIB. Species about 100, tropical Asiatic and African, rarely American.

A genus with difficulty distinguished from the 1-ovuled species of *Webera*, except by habit, the slender corolla-tube, and 4-merous flowers. The species are most difficult to limit and diagnose, and the subdivisions here proposed are only approximately reliable. Probably more of the Indian species are referable to Malayan, and especially Bornean ones than I have ventured to identify with these. *Pavetta* differs in the bracts and very long style, always twice as long as the corolla or more.

SECT. I. **Euixora.** *Flowers* 4- very rarely 5-merous, 2-bracteolate. *Corolla-tube* very slender.

* Calyx-teeth longer than the ovary, lanceolate subulate or filiform. Cymes corymbiform (except in *I. lanceolaria* and *Notoniana*).

1. **I. acuminata,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 383; glabrous, leaves petioled elliptic or linear-oblong acuminate coriaceous, floral pair obovate or oblanceolate from a sessile auricled or rounded base, cymes sessile or subsessile corymbiform contracted dense-flowered, bracteoles elongate subulate, calyx glabrous teeth lanceolate much longer than the ovary, corolla-tube very slender 1–1¼ in., lobes narrowly obovate, mouth pubescent or villous. *DC. Prodr.* iv. 488; *Wight Ic.* t. 706 (*not good*); *Wall. Cat.* 6126.

SIKKIM HIMALAYA, alt. 3000 ft., *C. B. Clarke*; BHOTAN, *Griffith*; ASSAM, KHASIA MTS., ascending to 4000 ft., and CACHAR, *Hamilton*, &c.; CHITTAGONG, *C. B. Clarke.*

A robust glabrous shrub; branches smooth. *Leaves* very variable, floral sometimes only ½ in., rounded or linear-oblong, in extreme forms 12 by 6 in. with a cordate base;

other leaves 5–9 by 1½ to 3 in., narrowed into a very short petiole ⅙–½ in., pale when dry, very coriaceous; nerves 15–20 pair, slender, arching; stipules broad with very short points. *Cymes* 2–4 in. diam., sometimes almost capitate, quite glabrous; flowers white, sweet-scented, sometimes 5-merous; bracts and bracteoles long, filiform. *Calyx* ¼–⅓ in. *Corolla* ⅔ in. across the narrow obtuse lobes. *Anthers* sessile. *Stigma* fusiform or 2-fid, with short arms. *Fruit* ¼–¾ in. long, ellipsoid or oblong, straight or oblique, crowned with the slender calyx-teeth.—The extreme forms are the Sikkim, with 5-merous flowers and very small orbicular floral leaves; and Upper Assam ones, with these sometimes 20 in. long and 7 broad. Griffith's Bhotan specimens (Kew Distrib. 2983) have calyx-teeth sometimes hardly longer than the tube.

2. **I. lanceolaria,** *Colebr. in Roxb. Fl. Ind.* i. 387; glabrous or the cymes pubescent, branches slender, leaves short-petioled lanceolate or linear-lanceolate subacute, nerves very slender, cymes sessile or peduncled corymbiform or brachiate, branches slender, calyx-teeth oblong-lanceolate much longer than the ovary, corolla glabrous, tube very slender ½–¾ in., lobes linear-oblong obtuse, mouth naked. *DC. Prodr.* iv. 484; *W. & A. Prodr.* 429; *Wt. Ic.* t. 827; *Wall. Cat.* 6125; *Bot. Mag.* t. 4399. I. leucantha, *Heyne in Wall. Cat.* 6148; *G. Don Gen. Syst.* iii. 572. I. Wallichii, *Herb. Wight, not of W. & A. Prodr.*

WESTERN PENINSULA, from Belgaum southwards, *Berry*, &c.

An erect shrub with "ash-coloured branches and pendulous slender green branchlets with compressed joints" (*Roxb.*). *Leaves* spreading, 5–7 by ⅔–2 in., quite smooth and rather shining on both surfaces, pale and reticulate when dry; nerves numerous, slender, often almost horizontal; base rounded or acute; stipules short, with long slender points. *Cymes* 2–3 in. diam., from glabrous to hoary-pubescent; branches erecto-patent; bracts and bracteoles oblong-lanceolate, caducous. *Calyx* ¼ in. long, glabrous, with 2 erect appressed bracteoles; teeth linear-oblong or lanceolate. *Corolla* white, ¾ in. across the narrow lobes. *Filaments* slender. *Stigma* slender. *Fruit* globose or didymous, calyx-teeth persistent.—In W. & A. Prodr. is a var. β, founded on Wight's n. 1318, and described as having oblong-lanceolate leaves sometimes pubescent beneath; I do not find the latter character on Wight's specimens. *I. Wallichii* of Wight's Herbarium is not the plant described under that name in the Prodromus, not having leaves pubescent beneath, but a slight variety of *I. lanceolaria* with narrower bracts and elliptic-lanceolate leaves.

3. **I. calycina,** *Thw. Enum.* 155; glabrous, leaves subsessile ovate oblong or orbicular obtuse or acute, base acute rounded or cordate, nerves horizontal, cymes subsessile corymbiform contracted dense-flowered, calyx-teeth lanceolate much longer than the ovary, corolla ¾ in., lobes ovate acute, mouth glabrous. *Bedd. Ic. Pl. Ind. Or.* t. 97.

CEYLON; Central Province, ascending to 7000 ft., *Macrae, Walker*, &c.

A small tree. *Leaves* 1½–3 in., coriaceous, midrib stout, dark brown and reticulate when dry; nerves 6–8 pair, slender; stipules cuspidate. *Cymes* rarely peduncled, peduncles puberulous; flowers white tinged with rose, subsessile; bracts and bracteoles slender. *Stigma* short thick with short recurved arms. *Filaments* short. *Fruit* ¼ in., ovoid or spherical; calyx-teeth persistent.

4. **I. Thwaitesii,** *Hook. f.*; glabrous or shoots and cymes pubescent, leaves short-petioled oblanceolate oblong or elliptic acute flat or undulate, nerves ascending, cymes sessile corymbiform contracted dense-flowered, calyx-teeth acute longer than the ovary, corolla 1–1¼ in., lobes obovate acute. I. acuminata, *Thw. Enum.* 155, *excl. var.* β, *not of Roxb.*

CEYLON; not uncommon, ascending to 3000 ft.

Leaves 3½–5 in., thinly coriaceous, opaque, margins usually undulate, always narrowed into the short petiole; stipules with long cuspidate points. *Cymes* as in *I. calycina*, but calyx-teeth shorter and corolla longer with longer lobes, stigmas the same. *Corolla-throat* glabrous, in which it differs from Roxburgh's *R. acuminata.*

Anthers sessile. *Fruit* globose or didymous, $\frac{1}{2}$ in. diam., smooth.—I have seen no specimen of Thwaites' *var. β*, with the branches and leaves on both sides velvetty.

5. **I. Notoniana,** *Wall. Cat.* 6132; robust, glabrous except the puberulous cyme, leaves petioled elliptic or oblong obtuse thickly coriaceous, nerves 12–15 pair, cymes peduncled brachiate many-flowered clusters rounded, calyx-teeth lanceolate longer than the ovary, corolla $\frac{1}{2}$ in., tube very slender, lobes oblong obtuse glabrous, mouth glabrous. I. Wightiana, *Wall. Cat.* 6161. I. grandiflora, *Schlecht. in Herb. Hohen.* No. 1369.

NILGHERRY and PULNEY MTS., *Wight*, &c.

Branches thick, bark rough. *Leaves* 6–8 by 1–3 in., rarely obovate, pale brown when dry, base acute or obtuse; nerves 10–12 pair, strong, ascending; petiole stout, $\frac{1}{4}$–$\frac{2}{3}$ in.; stipules with long strong cuspidate points, glabrous. *Cymes* sometimes 6 in. diam.; peduncles stout, 2–6 in.; lower bracts often leafy; bracteoles setaceous; flowers red, shortly pedicelled, glabrous. *Anthers* sessile, nearly as long as the corolla-lobes, base subentire. *Stigma* small, clavate, entire or cleft. *Fruit* glabrous, $\frac{1}{3}$ in. diam.

6. **I. Johnsoni,** *Hook. f.*; glabrous, branches robust, leaves petioled large elliptic acute at both ends, stipules triangular acute, cymes sessile corymbiform, branches very short and flowers densely crowded, calyx-teeth linear-lanceolate much longer than the tube, corolla-tube $\frac{3}{4}$ in., lobes linear-oblong acute, mouth naked.

WESTERN PENINSULA, near Wenna Mala in Cochin, *Rev. Mr. Johnson.*

Leaves crowded on the young branches, 6–8 by 3–3$\frac{1}{2}$ in., thinly coriaceous, brown when dry, opaque; nerves 12–15 pair, arched, prominent beneath; petiole very stout, $\frac{1}{6}$ in.; stipules short, appressed. *Cymes* 1$\frac{1}{2}$ in. long, branches rather slender but very short and much divided; bracts and bracteoles lanceolate, coriaceous, numerous. *Calyx-teeth* rigid, erect, broader as well as longer than the ovary. *Filaments* and anthers slender. *Stigma* fusiform, cleft. *Fruit* not seen.—I have seen but one specimen of this fine species.

7. **I. subsessilis,** *Wall. Cat.* 6139; glabrous, leaves petioled lanceolate elliptic or oblanceolate acuminate, stipules with long cusps, cymes subsessile brachiate, branches slender lax-flowered, calyx-teeth filiform much longer (rarely only equalling) than the ovary, corolla-tube $\frac{1}{2}$–1$\frac{1}{2}$ in., excessively slender, lobes narrowly oblong acute, mouth glabrous. *G. Don Gen. Syst.* iii. 572. I. oxyphylla, *Wall. Cat.* 6159.

ASSAM and KHASIA MTS., ascending to 4000 ft., *De Silva*, &c.

A shrub or small tree; branches with pale bark. *Leaves* very variable, 4–8 by $\frac{3}{4}$–3 in., thinly coriaceous, pale when dry, opaque or shining; nerves very slender; subulate points of stipules much longer than the short sheath. *Cymes* 1–5 in. diam.; bracts elongate-subulate or filiform; flowers white or rosy. *Calyx-teeth* variable in length. *Corolla-limb* $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *Filaments* long, flattened; anthers very slender. *Stigma* slender, entire or cleft. *Fruit* $\frac{1}{3}$ in. diam., gibbous, crowned with the slender calyx-teeth.—Wallich's *I. oxyphylla* has shorter calyx-teeth, but seems connected by intermediates with *subsessilis.* Some Assam specimens have teeth even shorter than the ovary.

8. **I. Brunonis,** *Wall. Cat.* 6136; branches tomentose, leaves long sessile narrowly oblanceolate caudate-acuminate pubescent with spreading hairs, base cordate, cymes sessile corymbiform hirsute, flowers subcapitate, calyx-teeth linear-lanceolate about equalling the ovary, corolla-tube $\frac{1}{2}$ in. hairy, mouth naked. *G. Don Gen. Syst.* iii. 573; *Kurz For. Fl.* ii. 20. Pavetta Brunonis, *Miq. Fl. Ind. Bat.* ii. 270 (*not of Wt. Ic.*). Rubiacea, *Wall. Cat.* 8447.

PEGU and TAVOY, *Kurz.* PENANG and SINGAPORE, *Wallich, Phillips*, &c. *Maingay* (Kew Distrib. 858).

A shrub or small tree. *Leaves* 7–12 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., brownish when dry, membranous, points long and slender, above often glabrate, beneath hairy chiefly on the 15–20 pair of slender nerves, sometimes obscurely contracted above the cordate base (panduriform); stipules villous with very long filiform hairy points. *Flowers* sessile amongst filiform bracteoles. *Calyx-teeth* very slender. *Corolla* $\frac{1}{2}$ in. diam.; lobes lanceolate, acuminate, $\frac{1}{3}$ the length of the tube. *Filaments* subulate. *Stigma* small. *Fruit* ellipsoid or globose, $\frac{1}{3}$ in. long, glabrous.

** Calyx-teeth longer and broader than the ovary, elliptic oblong or suborbicular; cymes corymbiform.

9. **I. polyantha,** *Wight Ic.* t. 1066; robust, glabrous except the villous or pubescent cymes, leaves large sessile or short-petioled obovate elliptic-oblong or -lanceolate acuminate coriaceous, cymes subsessile corymbiform contracted or open very many-flowered branches robust, calyx-lobes ovate-lanceolate very much longer and larger than the ovary, corolla glabrous, tube slender $\frac{1}{2}$–$1\frac{1}{2}$ in., lobes narrowly obovate obtuse, mouth glabrous. I. corymbosa, *Heyne in Wall. Cat.* 6155. I. grandis, *Miq. in Herb. Hohenack.* n. 517.

WESTERN PENINSULA; on the Ghats from the Concan to Cochin, *Wight, Law,* &c.

Shrubby, branches robust. *Leaves* 6–12 by $2\frac{1}{2}$–5 in.; pale greenish when dry, narrowed to the short stout petiole; stipules broad with long cuspidate points. *Cymes* either collected into a globose sessile head or more open and 4 by 5 in. long and broad; branches suberect, sometimes white with dense woolly spreading hair; bracts and bracteoles oblong, acute, membranous, caducous; flowers sessile. *Calyx* sometimes $\frac{1}{3}$ in. long, pubescent, lobes like the bracteoles. *Corolla* $\frac{2}{3}$ in. diam., quite glabrous. *Filaments* flattened. *Stigma* rather large, with stout recurved arms. *Fruit* not seen.—The bracts and calyx are very different from those of any congener.

10. **I. Kingstoni,** *Hook. f.*; glabrous, branches and leaves above shining, leaves petioled elongate oblong or oblanceolate obtusely acuminate membranous, cymes sessile between two small leaves corymbiform contracted dense-flowered, branches short and stout puberulous, calyx-teeth membranous glabrous almost orbicular larger than the ovary, corolla-tube 1–$1\frac{1}{2}$ in. very slender, lobes obovate obtuse, mouth naked.

MALACCA, *Griffith* (Kew Distrib. 2996).

Branches as thick as a duck's quill, black, smooth, and polished when dry, internodes long. *Leaves* 7–12 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., pale brown when dry, deflexed in flower, erect in the fruit, base acute; nerves slender, 15–20 pair; petiole $\frac{1}{3}$ in., black; stipules short, closely appressed, apiculate. *Cymes* 4 in. diam., very dense-flowered; bracts and bracteoles broadly elliptic, coriaceous, deciduous. *Calyx* $\frac{1}{4}$ in. long, glabrous. *Corolla* red?, limb $\frac{3}{4}$ in. diam. *Stigma* small, entire or notched. *Filaments* flattened. *Fruit* $\frac{1}{3}$ in. long, globose or obliquely ovoid, crowned by the broad calyx-lobes. The membranous leaves, stout short cyme-branches and the calyx, afford good characters. It is clearly allied to *I. acuminata.* Mr. Kingston, whose services this very handsome species commemorates, was for some years an active assistant in the Herbarium department of Kew.

11. **I. merguensis,** *Hook. f.*; glabrous, very robust, leaves large obovate or oblong-obovate abruptly acuminate opaque coriaceous, cymes sessile corymbiform globose densely many-flowered excessively branched from the very base, calyx-teeth puberulous elliptic longer than the ovary, corolla-tube $\frac{2}{3}$ in. slender, lobes obovate or oblong obtuse, mouth nearly naked.

TENASSERIM; Mergui, *Griffith* (Kew Distrib. 3003).

A low shrub; branches stout, cylindric, grey and opaque when dry. *Leaves* 7–12 by $2\frac{1}{2}$–5 in., pale when dry and quite dull, narrowed into a short stout petiole; stipules very short, coriaceous, apiculate. *Cymes* 3–4 in. diam.; branches quite hidden by the flowers; bracts broad, deciduous; flowers odorous, white or pale pink with a red

or rosy tube. *Corolla-throat* with a few hairs. *Anthers* sessile, base subentire. *Stigma* rather large, with short diverging arms. *Fruit* not seen.

*** Calyx-teeth equalling or shorter than the ovary.

† *Cymes long-peduncled, peduncles 2 in. long or more, often inclined or pendulous, cymes brachiate in all. See also under* §§ (*sp.* 25 *to end*).

12. **I. elongata,** *Heyne in Wall. Cat.* 6131; glabrous except the hairy flowers, leaves petioled elliptic or elliptic-lanceolate or oblanceolate, peduncles 4–8 in. with 2 sessile leaves below the middle, cymes brachiate, calyx-teeth subulate equalling the ovary, corolla-tube very slender ½ in., lobes very small short oblong, throat naked. *G. Don Gen. Syst.* iii. 571. I. pedunculata, *Dalz. in Hook. Kew Journ.* iii. 121; *Dalz. & Gibs. Bomb. Fl.* 113.

The CONCAN and CANARA; from Bombay to Kurg, *Heyne*, &c.

A shrub; branches slender, smooth. *Leaves* 6–9 by 2½–4 in., membranous, pale when dry, narrowed into a petiole ½–1 in., the pair on the peduncle 1–4 in. more oblong with rounded or cordate bases; stipules broadly ovate, cusp slender. *Cyme* 4–5 in. diam.; peduncle strict, glabrous, branches 1–3 in., and pedicels pubescent; flowers fascicled, pink; bracts and bracteoles subulate. *Calyx-teeth* subacute, pubescent. *Corolla* with spreading hairs or glabrate, limb ⅙ in. diam. *Filaments* very short. *Stigma* small, simple or cleft. *Fruit* (not seen by me) smooth, slightly 2-lobed.

13. **I. spectabilis,** *Wall. Cat.* 6133; quite glabrous, or calyx puberulous, leaves petioled elliptic-oblong obtuse or acute, peduncles 6–10 in. with 2 sessile leaves below the middle, cymes brachiate, calyx-teeth subulate shorter than the ovary, corolla-tube very slender ½–⅔ in., lobes linear, mouth naked. *G. Don Gen. Syst.* iii. 572; *Kurz For. Fl.* ii. 22.

ARRACAN to TENASSERIM, frequent, *Wallich*, &c.

An evergreen tree. *Leaves* 5–8 by 2–3 in., varying in form, equally rounded at both ends or tapering towards the tip or base, membranous or coriaceous, pale when dry, the pair on the peduncle occupying the same position as in *I. elongata*; rarely a similar pair occurs at the base of the peduncle, or several upper pairs are sessile or cordate; petiole ¼–⅓ in.; stipules short, cusp compressed subulate. *Cymes* and bracts as in *I. elongata* but glabrous, the flowers looser and the corolla-lobes much larger and longer, nearly ¼ in. long. *Filaments* slender; anthers very long. *Fruit* size of a pea, globose or didymous.

14. **I. pendula,** *Jack in Mal. Misc.* i. 11; quite glabrous, leaves petioled large linear-oblong or -ovate or -oblanceolate obtuse, cymes pendulous brachiate, peduncle 2–7 in. naked, calyx-teeth shorter than the ovary obtuse, corolla-tube very slender 1–1½ in., lobes linear-oblong, mouth naked. *DC. Prodr.* iv. 487; *Wall. Cat.* 6127. Pavetta pendula, *Miq. Fl. Ind. Bat.* ii. 269.

PENANG, *Wallich, Phillips, Maingay* (Kew Distrib. 842); MALACCA, *Griffith* (Kew Distrib. 2991).

A shrub 3–4 ft.; branches slender for the size of the foliage, smooth. *Leaves* 8–12 by 2–5 in., coriaceous, pale, sometimes whitish beneath, narrowed to the base; nerves slender, about 12 pair; petiole ½–¾ in.; stipules broad, cusp long. *Peduncle* 3–8 in., slender, with sometimes a small pair of oblong sessile leaves near the base; cyme 4–6 in. diam.; flowers red, not fascicled; bracts and bracteoles minute, filiform. *Anthers* sessile. *Stigma* small, entire or cleft. *Fruit* not seen.

15. **I. diversifolia,** *Wall. Cat.* 6146; glabrous, leaves petioled linear-oblong or -lanceolate or ovate-lanceolate obtuse, upper pair often sessile, cymes brachiate, peduncle 3–6 in. very slender, calyx-teeth triangular shorter than the ovary, corolla-tube slender ½ in., lobes linear obtuse, mouth naked. *Kurz For. Fl.* ii. 22.

MARTABAN, TENASSERIM, and ANDAMAN ISLANDS, in forests, *Wallich, Helfer* (Kew Distrib. 2992).

A large evergreen shrub. *Leaves* 4–9 by 1½–2½ in., rather membranous, brown when dry, shining above; nerves 15–18 pair, very slender, horizontal or arched; floral pair very variable, large or small, base rounded or cordate; petiole ¼–⅜ in.; stipules with long cusps. *Peduncles* very slender, often from short lateral shoots; cyme 2–3 in. diam., few-flowered; flowers loose, white, sessile or pedicelled; bracts and bracteoles minute, subulate or obsolete. *Filaments* slender. *Stigma* cleft. *Fruit* size of a pea, didymous.

16. **I. Brandisiana,** *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 25; glabrous except the cyme, leaves short-petioled elliptic- or oblong-lanceolate acuminate, peduncles 4–5 in. drooping, cymes small subbrachiate branches short, calyx-teeth triangular shorter than the ovary, corolla-tube ¾–1 in. (1½–2 in., *Kurz*), lobes oblong, mouth villous.

UPPER TENASSERIM, *Helfer*; at Attran, *Brandis.*

An evergreen shrub. *Leaves* 4–6 by 1¼–2 in., rather membranous, dark brown when dry, finely acuminate, base rounded or acute; nerves 12–14 pair, slender; uppermost pair often small and sessile; petiole ⅙–¼ in.; stipules broad, cusp long. *Cyme* ½–2 in. diam.; branches short, pubescent, soon dividing and rather stout, puberulous; bracts and bracteoles minute, subulate; flowers rather fascicled, white. *Corolla* very long (Kurz). *Anthers* sessile, base entire. *Fruit* unknown.—I have only two indifferent specimens from Dr. King and Helfer: both agree in all respects with Kurz's description, except that the peduncles are not short, nor the corolla-lobes acute, and the flowers do not exceed 1 in. in length. The remarkable acumination of the leaves, and the cymes being hardly brachiate, distinguish it from all others of this group.

†† *Peduncle of cyme less than 2 in.; erect or suberect, or* 0.

§ *Cymes not articulate at the ramifications, brachiate, rarely corymbiform.*

17. **I. brachiata,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 381; quite glabrous or cymes pubescent, leaves petioled oblong or elliptic obtuse, cymes sessile or shortly peduncled brachiate with 2–3 pairs of long branches, flowers in globose clusters, calyx-teeth shorter than the ovary, corolla-tube ⅙ in., lobes short obtuse globose in bud, mouth naked. *DC. Prodr.* iv. 488; *W. & A. Prodr.* 429; *Wight Ic.* t. 710; *Wall. Cat.* 6142. I. obtusata *and* I. Arnottiana, *Miq. in Herb. Hohenack.* 161 and 565.

WESTERN PENINSULA; on the Ghats from the Concan southwards.

A tree 30 ft., or a stout shrub. *Leaves* 3–7 by 1½–3 in., pale when dry, always obtuse, coriaceous or rather membranous, narrowed or rarely rounded at the base; nerves as faint as the veins; petiole ¼–¾ in.; stipules short, cusps short. *Cymes* 4–6 in. long and broad, rachis and long horizontal branches slender inarticulate, internodes distant; lower bracts stipuliform, bracteoles minute; flowers white, odorous, sessile or pedicelled. *Anthers* sessile. *Style* glabrous or pubescent; stigma subcapitate, simple or cleft. *Fruit* globose or obscurely didymous. *Seeds* very thin, sides incurved so that the transverse section represents a dorsally compressed tube.—Flowers the smallest of the genus, and the only one with globose buds.

18. **I. parviflora,** *Vahl Symb.* iii. 11, t. 52; glabrous, or the cymes pubescent, leaves subsessile oblong or elliptic obtuse base rounded or cordate very rarely narrowed, cymes sessile brachiate with 3–5 pairs of short branches, flowers in subglobose clusters, calyx-teeth very short obtuse, corolla glabrous, tube ⅓ in., lobes oblong, buds ovoid. *Roxb. Fl. Ind.* i. 383; *DC. Prodr.* iv. 488; *Wight in Hook. Bot. Misc.* iii. 293, *Suppl.* t. 34; *Ic.* t. 711; *W. & A. Prodr.* 429; *Bedd. Fl. Sylv.* t. 222; *Dalz. & Gibs. Bomb. Fl.* 113; *Brand. For. Fl.* 275; *Kurz For. Fl.* ii. 21. I. arborea, *Roxb.*; *DC. l. c.* I. decipiens, *DC. l. c.* I. Pavetta, *Andr. Bot. Rep.* t. 78 (*not of Roxb.*).

Hilly districts of W. BENGAL, BEHAR, and the WESTERN PENINSULA, from the Satpura range southwards. CHITTAGONG, *C. B. Clarke.* PEGU, *Kurz.* CEYLON; hot drier parts of the island.

An evergreen tree. *Leaves* 3–6 by 1½–2½ in., very coriaceous, pale when dry; nerves slender, rather stronger than the reticulate venules; petiole very stout; stipules short, cusps short. *Cymes* 2–6 in., inarticulate, internodes shorter than in *I. brachiata*, and branches much shorter; lower bracts stipuliform, upper and bracteoles minute or obsolete; flowers white, odorous, sessile or pedicelled. *Filaments* short. *Style* very pubescent; stigma subcapitate, simple or cleft. *Fruit* small, didymous. *Seeds* plano-convex.—I have seen no Pegu specimens.—*Touch-wood.*

? VAR. *zeylanica*; leaves longer petioled broadly elliptic or obovate acute or acuminate cuneate at the base more membranous less reticulate, stipules with longer cusps, cyme-branches longer.—I. jucunda, var. γ, an species distincta? *Thwaites Enum.* 155. Ceylon, *Walker*, &c.—This is certainly very near indeed to *I. parviflora*, agreeing entirely even to the pubescent style and the anthers and form of seed, as far as I can ascertain from imperfect fruits, and differs from *I. jucunda* widely in the cymes, length of the corolla, and form of its lobes.

19. **I. grandifolia,** *Zoll. & Morr. Syst. Verz.* 65; glabrous or the cymes puberulous, leaves often very large petioled elliptic ovate oblong or lanceolate obtuse or acute, stipules large with a long cusp or the upper 2-fid, cymes sessile brachiate or corymbiform ramifications inarticulate, branches more or less stout, bracts and bracteoles obsolete, flowers pedicelled, filaments subulate, anthers very slender, calyx-lobes small triangular or obtuse, corolla glabrous, tube ⅓–1½ in., lobes oblong obtuse, mouth naked. I. elliptica, *Br. in Wall. Cat.* 6153.

ANDAMAN and NICOBAR ISLANDS to SINGAPORE, MALACCA, and PENANG, *Wallich*, &c.—DISTRIB. Malay Archipelago (all the forms).

I am quite unable to distinguish specifically various of the very dissimilar forms that occur in the localities specified; all have pedicelled white or pale pink flowers, fruit the size of a large or small pea, and their seeds are very concave ventrally. The principal are:

VAR. *coriacea*, Br. in Wall. Cat. 6151 (sp.); I. macrosiphon, *Kurz in Trimen. Journ. Bot.* 1875, 327; *For. Fl.* ii. 24; branches very stout with whitish bark, leaves 12–18 by 4–5 in. elliptic base acute obtuse or rounded, petiole very robust, cymes with very thick suberect flowering branches spreading in fruit, corolla-tube ⅓ in.—Penang, *Wallich.*—Griffith's specimens from Malacca (Kew Distrib. 2999) have narrower lanceolate bases and shorter petioles, and the cymes reduced to a fascicle of thick primary branches starting from the end of the branch. Kurz's from S. Andaman have dark leaves 12–14 by 4½–5 in., with rounded bases, almost black, and similar cymes.—*Pavetta macrophylla*, Blume, appears a large-flowered form of this, as is probably *P. Teysmanniana* and *P. macrocoma* of Miquel.

VAR. *arborescens*, Hassk. (sp.) in Retzia, i. 22; branches more slender usually with white bark, leaves 4–10 by 2–3 in., usually more membranous, rachis of cyme elongate, branches horizontal, flowers looser, corolla-tube ⅓ in.—Penang and Malacca, *Griffith* (Kew Distrib. 2987).

VAR. *Kurzeana*, Teysm. & Binnend. (sp.) in Nat. Tijdsch. Ned. Ind. xxvii. 100, *ex Kurz in Journ. As. Soc.* 1876, ii. 134; leaves lanceolate thin narrowed into a stout petiole, cymes corymbiform, corolla 1–1½ in.—Nicobar Islands, *Kurz.*

VAR. *rosella*, Kurz For. Fl. ii. 23 (sp.); leaves 6–8 by 3½–4½ in. thin elliptic-oblong or obovate acute or acuminate margins often undulate, nerves nearly horizontal, petiole ½–1 in., cymes corymbiform, corolla ½–⅔ in.—South Andaman Islands, *Kurz.*

20. **I. brunnescens,** *Kurz in Journ. As. Soc.* 1872, ii. 317; *For. Fl.* ii. 24; glabrous, leaves sessile or subsessile broadly obovate obtuse on tip rounded opaque, base rounded or cordate, nerves very faint horizontal, cymes small

brachiate sessile or peduncled, flowers all pedicelled, calyx-teeth minute triangular, corolla glabrous, mouth naked.

ANDAMAN ISLANDS, in beach jungles, *Helfer*, *Kurz*; NICOBAR ISLANDS, *Kurz*.

Possibly a form of *I. grandifolia*, but the leaves are of a very different shape, almost or altogether sessile, very opaque, 5–8 by 3–4 in., with very slender nerves and the veins not raised, margins often undulate; stipules broad, cusps short. *Cymes* ebracteate even in bud; ramifications inarticulate; fully formed flowers not seen. *Fruits* globose, size of a small pea; pedicel sometimes ¼ in., slender.

21. **I. jucunda,** *Thw. Enum.* 155, *excl. var.* γ (*not of Bot. Mag.*); cymes puberulous, leaves lanceolate oblong elliptic or oblanceolate obtuse or obtusely acuminate narrowed into a short petiole, stipules very short mucronate or shortly cuspidate, cymes sessile corymbiform usually with many branches from the base, bracts or bracteoles minute or obsolete, flowers pedicelled, calyx-teeth minute obtuse, corolla white glabrous, tube 1–1½ in., lobes ovate acute, mouth naked. Pavetta Wyckii, *Hassk. Retz.* i. 21, *ex Kurz in Journ. As. Soc.* 1877, ii. 149.

CEYLON; common, ascending to 4000 ft., *Walker*, &c.

This again is very near *I. grandifolia*, but the leaves are narrower and never so large as they become in that plant, usually 4–5 by 1½–2 in., but sometimes 6–8 by 3–3½ in., base rarely rounded, membranous or coriaceous, stipules much shorter, ramifications of cyme inarticulate and corolla-lobes acute, fruit the same, flowers white or pink.

§§ *Branches tomentose or pubescent. Cymes articulate at the ramifications, brachiate.*

22. **I. villosa,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 383; branches short, petioles and cymes pubescent or tomentose, leaves large elliptic-oblong lanceolate or oblanceolate caudate-acuminate, base narrowed or rounded, stipules with long often spreading filiform points, cymes peduncled, branches long brachiate, flowers white, calyx-teeth short, corolla glabrous, tube 1 in. very slender. *DC. Prodr.* iv. 488; *Wight Ic.* t. 150; *Kurz For. Fl.* ii. 21; *Wall. Cat.* 6137.

SIKKIM HIMALAYA, *J. D. H.*; ASSAM, the KHASIA MTS., SILHET, CACHAR, PEGU, and PENANG, *Wallich*, &c.

Shrubby. *Leaves* 6–16 by 2½–5½ in., very variable in shape, brown when dry, thinly coriaceous, glabrous above, beneath pubescent chiefly on the 10–12 pair of nerves or glabrate; petiole ⅙–⅓ in.; stipules ½–1 in., tomentose. *Peduncle* stout, 2–4 in.; cymes and ramifications hardly articulate; lower bracts often leafy, upper linear-subulate; flowers crowded, fragrant, shortly pedicelled. *Corolla-lobes* oblong, notched. *Filaments* subulate; anthers slender. *Style-arms* slender, free or connate. *Fruit* size of a pea, smooth, red. *Seeds* concave ventrally, with a median ridge (in Roxburgh's figure).—After flowering the calyx-teeth sometimes exceed the tube, when the latter does not swell and form fruit.

23. **I. cuneifolia,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 380; branches short, petioles and cymes pubescent or puberulous, leaves lanceolate or oblong- or elliptic-lanceolate or oblanceolate obtusely acuminate coriaceous base acute, stipules with short filiform cusps, cymes sessile or short-peduncled brachiate, branches short, calyx-teeth equalling or shorter than the ovary, corolla glabrous, tube ½–⅔ in. very slender, mouth naked. *DC. Prodr.* iv. 487; *W. & A. Prodr.* 428; *Wt. Ic.* t. 709; *Wall. Cat.* 6140; *Kurz For. Fl.* ii. 21; *Bot. Reg.* t. 648. I. puberula, *Wall. Cat.* 6145, *excl. c.* I. rosea, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 398 (*not of Wall. Cat.*); *Lindl. in Bot. Reg.* t. 540. Pavetta Ackeringæ, *Teysm. & Binn. fide Kurz.*

SILHET, *De Silva*; PEGU, TENASSERIM, and MARTABAN, *M'Clelland, Kurz, Griffith* (Kew Distrib. 2995).

Shrubby. *Leaves* 5–8 by 2–3 in., coriaceous, pale when dry, variable, base always cuneate or narrowed into the petiole, sometimes puberulous beneath; stipules ¼–½ in. *Cymes* and white flowers very much as in *I. villosa*, but sessile or shortly pedicelled, puberulous or glabrate, and the flowers shorter and corolla-lobes not notched. *Filaments* slender. *Fruit* the size of a pea, red. *Seeds* ventrally concave with no median ridge (in Roxburgh's drawing).—A very large specimen from Rangoon has elliptic leaves 9 by 3½ in. Wight and Arnott describe the calyx-teeth as twice the length of the ovary, which is not the case. Kurz enumerates 3 varieties:—1. *Roxburghii*, with glabrous leaves and sessile or short-peduncled cymes; 2. *puberula*, with leaves puberulous beneath and larger peduncled cymes; 3. *pumila*, 1–3 ft., flowers often pale rose, cymes small short more slender.

§§§ *Branches glabrous. Cymes articulate at the ramifications, corymbiform, rarely brachiate.*

24. **I. coccinea,** *Linn.*; *Roxb. Fl. Ind.* i. 375; glabrous, leaves sessile or subsessile shortly oblong, base rounded or cordate rarely cuneate, tip rounded or apiculate, cymes sessile corymbiform dense-flowered, calyx-teeth minute shorter than the ovary, corolla-tube 1–1¾ in., lobes broad acute, mouth naked. *W. & A. Prodr.* 427; *Wight Ic.* t. 153; *Dalz. & Gibs. Bomb. Fl.* 112; *Brand. For. Fl.* 275; *Kurz For. Fl.* ii. 26. I. grandiflora, *Br. in Bot. Reg.* t. 154; *DC. Prodr.* iv. 486; *Wight in Hook. Bot. Misc.* iii., *Suppl.* t. 35. I. propinqua, *Br. in Wall. Cat.* 6119. I. incarnata, *DC. l. c.*? I. obovata, *Heyne in Roth Nov. Sp.* 90. I. Bandhuca, *Roxb. Hort. Beng.* 10: *Fl. Ind.* i. 376; *Wall. Cat.* 6120; *DC. l. c.*; *Bot. Reg.* t. 513; *Wight Ic.* t. 149. Pavetta coccinea *and* P. incarnata, *Blume Bijd.* 950. P. Bandhuca, *Miq. Fl. Ind. Bat.* ii. 266.—*Rheede Hort. Mal.* ii. t. 12; *Burm. Fl. Zeyl.* t. 57.

Cultivated throughout India, a native of the Western Peninsula, in the Concan, &c., *Dalzell & Gibson.* Chittagong, apparently indigenous, *J. D. H. & T. T.* Cultivated in Ava, Martaban, and Burma, *Kurz.* Ceylon; common, ascending to 2000 ft., *Thwaites.*

A branching shrub; branches strict, rather stout. *Leaves* 2–4 by 1–2 in., coriaceous, pale when dry; nerves 8–10 pair, distinct; stipules with rigid cusps. *Cymes* rarely shortly peduncled; ramifications very short, articulate; bracts and bracteoles subulate; flowers scarlet, sessile or very shortly petioled. *Filaments* long and anthers short for the genus. *Stigma* with short revolute arms. *Fruit* sometimes fleshy, size of a pea, crowned by the calyx-teeth. *Seed* very concave ventrally.—Roxburgh distinguishes *I. Bandhuca* from *I. coccinea* by being more branched, with stem-clasping obtuse leaves and ovate obtuse corolla-lobes. These characters should be looked to in India; they point to intermediates between *I. coccinea* and *stricta*. He further figures the seed of *coccinea* as plano-convex. A yellow flowering variety is said to be in cultivation.

25. **I. stricta,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 379; glabrous, leaves sessile or subsessile obovate or obovate-oblong obtuse or subacute base cuneate, cymes corymbiform sessile or peduncled, calyx-teeth shorter than the ovary obtuse or acute, corolla-tube ¾–1 in., lobes rounded, mouth naked. *DC. Prodr.* iv. 486; *W. & A. Prodr.* 427; *Wight Ic.* t. 184; *Kurz For. Fl.* ii. 26; *Wall. Cat.* 6123. I. coccinea, *Bot. Mag.* 169. I. alba, *Roxb. ll. cc.*; *Wight Ic.* t. 707; *Wall. Cat.* 6122. I. blanda, *Ker in Bot. Reg.* t. 100; *DC. l. c.* 487. I. incarnata, *Roxb.*; *D. C. l. c.* 486. I. crocata, *Lindl. in Bot. Reg.* t. 782; *DC. l. c.* 486. I. rosea, *Wall. Cat.* 6124; *Bot. Mag.* t. 2428; *not of Wall. in Roxb. Fl. Ind.*

Cultivated in various parts of India, but a native of the Moluccas and China, according to Roxburgh. Kurz regards it as indigenous in Rangoon and Upper Tenasserim.

There is little to distinguish this from *I. coccinea* but the smaller corolla-lobes and form of the leaves. Roxburgh figures the seeds as plano-convex, a character I

have no means of verifying. The flowers vary from scarlet and pink to white and yellowish.—Kurz makes 2 varieties:—1. *Roxburghiana*, with almost sessile leaves often rounded at the base, and subsessile or sessile cymes; and 2. *Blumeana* (Pavetta javanica, *Blume*), with short-petioled leaves acute at the base and laxer cymes on peduncles 1–1½ in. The latter of these I take to be *I. amœna*, Wall. Cat. 6121 A. B. C. *I. rosea*, Wall. Cat. 6124, from the Calcutta Garden, is probably a variety of this with acute calyx-teeth and narrower corolla-lobes.

26. **I. amœna,** *Wall. Cat.* 6121, D. E. F.; *G. Don Gen. Syst.* iii. 571; glabrous or cymes puberulous, leaves petioled lanceolate or oblong- or obovate-lanceolate acuminate, base acute, cymes sessile or peduncled corymbiform, flowers crowded, calyx-teeth ovate-lanceolate shorter than the ovary, corolla-tube 1–1½ in., lobes oblong obtuse, mouth naked.

Tenasserim, at Mergui, *Griffith* (Kew Distrib. 2986); Penang, *Wallich, Phillips, Maingay* (Kew Distrib. 846).—Distrib. Java.

This differs from *I. stricta* in its laxer more slender habit and longer lanceolate acuminate, more membranous leaves with petioles ⅙–¼ in., but I suspect it will prove only a form of that plant.

27. **I. fulgens,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 378; glabrous, branches slender polished, leaves petioled linear- or obovate-oblong abruptly acutely or obtusely acuminate, base acute, shining above with 20–30 pair of deeply sunk nerves, cymes large sessile or shortly peduncled corymbiform and very open or sub-brachiate, branches long slender spreading, flowers shortly pedicelled, calyx-teeth very short obtuse, corolla-tube 1–1¾ in., lobes ovate acute, mouth naked. *DC. Prodr.* iv. 486; *Wight Ic.* t. 151; *Wall. Cat.* 6152 A. I. salicifolia, *DC. l. c.* 487; *Bot. Mag.* t. 4523. Pavetta fulgens, *Miq. Fl. Ind. Bat.* ii. 264. P. salicifolia, *Blume Bijd.* 951. P. Lobbii, *Teysm. & Binnend. in Miq. Ann. Mus. Ludg. Bat.* iv. 194.

Tenasserim, *Helfer* (Kew Distrib. 2998); Malacca, *Griffith* (2985), *Maingay* (845); Singapore, *Lobb*; Penang, *Wallich*.—Distrib. Java, Borneo.

A shrub, branches erect. *Leaves* 5–9 by 1¼–2 in., membranous, dark brown when dry, surface often raised between the nerves, base always acute; petiole ¼–½ in.; stipules closely grasping the stem, with slender cusps. *Cyme* quite sessile, secondary branches long spreading horizontally, the whole forming a loose inflorescence 5–7 in. broad but not so high; bracts and bracteoles short, ovate, acute; flowers shortly pedicelled, orange then scarlet. *Fruit* spherical or didymous, "succulent and seed rugose," *Roxb.*

28. **I. congesta,** *Roxb. Fl. Ind.* i. 387; glabrous except the puberulous cymes, leaves large petioled elliptic or elliptic-oblong or -lanceolate abruptly obtusely acuminate, base rarely rounded, nerves strong 12–15 pair, stipules short with short cusps, cymes sessile or subsessile corymbiform, branches very stout suberect fastigate, calyx-teeth very short broadly triangular, corolla-tube 1–1½ in., lobes obtuse, mouth naked. *DC. Prodr.* iv. 486; *Wall. Cat.* 6158. I. Griffithii, *Hook. Bot. Mag.* t. 4325. I. fulgens, *Wall. Cat.* 6512 B. Pavetta congesta, *Miq. Fl. Ind. Bat.* ii. 269.

Tenasserim; Tavoy and Attran, *Wallich, Gomez*. Penang and Singapore, *Wallich*, &c. Malacca, *Griffith* (Kew Distrib. 2984), *Maingay* (848).

An evergreen tree (*Kurz*), closely allied to *I. fulgens*, differing in the stouter habit, very large usually coriaceous broader leaves 6–12 by 2–4 in., with nerves very prominent beneath, and petioles ½–¾ in., and the very stout cyme-branches, which do not spread, but are fastigiate; the stipules, too, are broader and shorter; the bracts are the same, very triangular, and the flowers are sometimes sessile, at others on stout pedicels; fruit ovoid or globose or didymous.

29. **I. rugosula,** *Wall. Cat.* 6158; glabrous except the cymes, leaves petioled ovate or elliptic or lanceolate acuminate, base acute or rounded, stipules

short, cymes sessile corymbiform dense-flowered, branches fastigiate, calyx-teeth short acute, corolla-tube ½ in., lobes linear-oblong obtuse, mouth naked. *Kurz For. Fl.* 25. ? I. sessiliflora, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 25.

PEGU and TENASSERIM; Attran, *Wallich*; Tavoy, *Gomez, Parish, Kurz.*

Differs from *I. congesta* in the leaves with fewer (8–10 pair) nerves, and the much smaller flowers with longer corolla-lobes and more slender anthers. Except in the smaller leaves, and according to Kurz, the shrubby habit and glabrous peduncled cyme and pale rose-coloured flowers *I. sessiliflora* does not seem to differ from *I. rugosula*, of the which it has the few nerves; it is perhaps a mountain form, found at 3000 to 4000 ft. elevation; I have, however, seen but one poor specimen, kindly sent by Dr. King. The flowers of *I. rugosula* are white.

30. **I. concinna,** *Br. in Wall. Cat.* 6149; glabrous, branches slender, leaves not large petioled elliptic-lanceolate obtusely acuminate, cymes small sessile or subsessile corymbiform, flowers mostly pedicelled, calyx-teeth ovate-lanceolate equalling the tube, corolla-tube ¼ in., lobes linear-oblong obtuse, mouth naked. Rubiaceæ, *Wall. Cat.* 8449.

MALACCA; Mt. Ophir, *Lobb, Maingay* (Kew Distrib. 847). SINGAPORE, *Wallich*, &c.

Leaves 3–5 by ¾–1¼ in., thin, pale brown when dry, hardly shining, base acute; nerves 10–12 pair, distinct arched; petiole ⅙–¼ in.; stipules ⅙ in. broad, cusp compressed rigid. *Cymes* quite sessile, or if peduncled with 2 small leaves at the top of the peduncle; branches erect; bracts and bracteoles subulate; pedicels short. *Calyx-teeth* subacute. *Filaments* subulate, half as long as the slender anther. *Stigma* cleft. *Fruit* size of a pea, pedicelled, globose or didymous, with persistent calyx-teeth. *Seed* thin, ventrally very concave.

31. **I. opaca,** *Br. in Wall. Cat.* 6141; glabrous except the puberulous cymes, branches slender, leaves petioled long narrow coriaceous linear-oblong or lanceolate obtuse, base acute or rounded, upper pair sometimes sessile, nerves 20–25 pair usually deeply impressed, cymes shortly peduncled corymbiform dense-flowered, branches very short fastigate, flowers sessile or subsessile, calyx-teeth very short obtuse, corolla-tube 1 in., lobes linear-oblong, mouth naked. *G. Don Gen. Syst.* iii. 573. Pavetta opaca, *Miq. Fl. Ind. Bat.* ii. 270.

PENANG, *Wallich*. MARTABAN; Moulmein, *Parish*.—DISTRIB. Siam.

A very distinct-looking plant, from the slender branches, long narrow 6–10 by 1¼–2 in., opaque pale brown leaves with spreading usually sunken nerves, and petioles ½ in. long; stipules short, cusps slender, as long as the broad portion. *Flowers* pink (*Parish*), bracts and bracteoles small. *Corolla-tube* obscurely puberulous in Mergui specimen, glabrous in Penang ones. *Fruit* not seen.

§§§§ *Branches glabrous. Cymes articulate at the ramifications, brachiate, rarely corymbiform.*

32. **I. undulata,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 385; glabrous or cymes pubescent, branches slender, leaves petioled elliptic or linear-lanceolate acuminate margins often undulate, cymes peduncled or sessile brachiate with 3–4 pair of slender branches, flowers loosely fascicled pedicelled and sessile, calyx-teeth lanceolate equalling the ovary, corolla-tube ¼–⅓ in., lobes linear obtuse, mouth naked. *Roth Nov. Sp.* 91; *DC. Prodr.* iv. 488; *W. & A. Prodr.* 428; *Wight Ic.* t. 708; *Wall. Cat.* 6129, *excl. Herb. Ham.* I. canjia, *Wall. Cat.* 6130.

EASTERN TROPICAL HIMALAYA; Nipal, Sikkim, and Bhotan, *Hamilton*,* *Griffith*, *J. D. H.*, &c. ASSAM, *Jenkins*. SILHET, at the foot of the Khasia Mts., *J. D. H. & T. T.* BEHAR, woods at Monghir, *Hamilton*.

Shrubby. *Leaves* 5–9 by 1½–2½ in., thin, shining above, pale when dry, base acute; nerves 20–30 pair, slender; petiole ¼–½ in.; stipules ¼–⅓ in., cusps com-

pressed. *Cymes* 4–8 in. and as broad, obscurely articulate; peduncle sometimes 2–3 in.; bracts and bracteoles subulate, persistent; flowers small, white. *Filaments* slender; anthers nearly equalling the corolla-lobes. *Stigma* cleft. *Fruit* pedicelled, size of a pea. *Seed* thin, with strongly incurved margins.

33. **I. barbata,** *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 384; glabrous, leaves petioled elliptic subacute thin upper pair at base of pedicels usually small sessile cordate, cymes shortly peduncled brachiate much broader than high, branches long slender divaricate, calyx-teeth very short subulate, corolla-tube 1–1$\frac{1}{2}$ in., lobes narrow, mouth woolly. *DC. Prodr.* iv. 487; *Wight Ic.* t. 185; *Kurz For. Fl.* ii. 22; *Bot. Mag.* t. 2505, 4513; *Wall. Cat.* 6128.

ANDAMAN and NICOBAR ISLANDS; frequent in forests, *Kurz.*

A large shrub. *Leaves* 6–8 by 2$\frac{1}{2}$–3$\frac{1}{2}$ in., usually elliptic and narrowed at the base, rarely rounded; nerves about 12 pair, slender; upper pair oblong-ovate, acute, from $\frac{1}{2}$–3 in. long; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules short, broad, cusp short. *Cymes* quite glabrous, 3–4 in. by 4–12 broad, the 2–3 pairs of branches being very long and wide-spread, much divided towards the end with slender branchlets and pedicelled lax white flowers; bracts at all the divisions narrowly lanceolate or the upper subulate. *Fruit* not seen.—Introduced into the Calcutta Garden before Roxburgh's time, but its native country unknown till Kurz found it in the Andamans, &c.

34. **I. oblonga,** *Br. in Wall. Cat.* 6147 A.; glabrous, branches stout, leaves petioled oblong obtuse at both ends, nerves about 12 pair, upper pair smaller sessile, stipules short, cymes peduncled small short brachiate, branches stout, calyx-teeth very short, corolla-tube $\frac{1}{2}$–$\frac{2}{3}$ in., lobes oblong obtuse, mouth naked.

TENASSERIM; at Amherst, *Wallich.*—DISTRIB. Java, Siam.

Leaves 3$\frac{1}{2}$–5 by 1–1$\frac{1}{2}$ in., thinly coriaceous, greenish when dry, similar and rather shining on both surfaces; nerves faint; petiole $\frac{1}{6}$ in.; stipules with short cusps. *Cymes* 1 in. high by 2–3 broad; peduncle and two pair of branches stout, the latter divided at the ends; bracts and bracteoles subulate, persistent; flowers white, odorous.—The Java, Siam, and Tenasserim specimens are singularly alike in size, colour, and form of leaves, and size and form of cymes, but the specimens are not numerous.

35. **I. lucida,** *Br. in Wall. Cat.* 6135; glabrous, shining, black when dry, branches slender, leaves very shortly petioled elliptic-ovate or -lanceolate long-acuminate base rounded or acute, nerves about 20 pair horizontal, cymes small peduncled corymbiform few-flowered, branches slender, bracts and bracteoles persistent, calyx-teeth lanceolate equalling the tube, corolla-tube 1 in. very slender, lobes linear acuminate, mouth pubescent, stigma short cleft. *G. Don Gen. Syst.* iii. 571.

PENANG, *Wallich.*

Leaves 3–5 by 1$\frac{1}{2}$–2 in., thin; nerves very slender, raised on both polished surfaces; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules very short, cuspidate. *Cymes* trichotomously branched, 1 in. long with very few branches, and rigid persistent subulate bracts; bracteoles also rigid, nearly as long as the calyx. The specimens are very insufficient; the habit and colour are those of *I. nigricans*, but the calyx-teeth, long corolla-tube with pubescent mouth, broader buds, and short stigma with short recurved arms, are very different.

36. **I. nigricans,** *Br. in Wall. Cat.* 6154; glabrous or cymes pubescent, black when dry, branches slender, leaves petioled elliptic-oblong or -lanceolate or -obovate obtusely and acutely acuminate, nerves 12–15 pair arched, cymes sessile or peduncled brachiate broader than long, branches slender, stipules with long cusps, calyx-teeth lanceolate or subulate acute, corolla-tube $\frac{1}{2}$ in., lobes slender, mouth naked, stigmas long slender arms. *W. & A. Prodr.* 428;

Wight Ic. t. 318; *Dalz. & Gibs. Bomb. Fl.* 113; *Kurz For. Fl.* ii. 23. I. affinis, *Wall. Cat.* 6144. ? I. densa, *Br. in Wall. Cat.* 6150.

WESTERN PENINSULA, or the Ghats from the Concan southwards; EASTERN PENINSULA, from PEGU to MALACCA; PENANG, *Maingay* (Kew Distrib. 859); CACHAR, *Keenan.*—DISTRIB. Birma, Malay Archipelago.

An evergreen tree or large shrub, branchlets and inflorescence as well as the leaves black when dry. *Leaves* 5–7 by 1–2½ in., membranous, base rounded or acute, upper pair rarely small elliptic and sessile; nerves very slender; petiole $\frac{1}{6}$–¼ in.; stipules with long hair-like cusps ½ in. long, or broad and shortly cuspidate. *Cymes* 2–6 in. broad, shorter than broad; peduncles erect, 2 in. and under or 0; bracts very slender, persistent or not; bracteoles subulate, very persistent; flowers few or numerous, white, odorous; lobes of corolla forming a very narrow bud not much broader than the tube. *Calyx-teeth* short or long, always acute or acuminate. *Filaments* slender; anthers very long, almost filiform. *Fruit* size of a pea, glabrous or didymous. *Seed* plano-convex (as far as I can ascertain).—The Cachar specimens have shorter calyx-lobes than the others. Apparently a common and a variable Malayan plant, published under several names, as *laxiflora*, Hassk.; *subulata*, Teysm. & Binnend; and *acutiflora*, Reinw. The *I. densa*, Br., from Penang, is probably a state of this with more coriaceous elliptic-lanceolate leaves, of a paler colour; the flowers are stated to be red, but as there are two plants on the sheet no confidence can be placed in the ticket.

VAR. *arguta*; leaves narrowly oblanceolate or elliptic-lanceolate acuminate 4–5 by 1–1¼ in.—I. ? arguta, *Br. in Wall. Cat.* 6157. Western Peninsula, *Heyne*; Purwur Ghat, Bombay, *Ritchie.*

37. **I. erubescens,** *Wall. Cat.* 6143; glabrous, black when dry, branches slender, leaves sessile or subsessile elliptic-oblong, tip rounded or obtuse, base cuneate or rounded, nerves 8–12 pair, upper pair often cordate, cymes peduncled or sessile brachiate, branches slender, stipules with slender cusps, calyx-teeth very small subacute, corolla-tube ½ in., lobes slender, mouth naked, stigma long arms slender. *G. Don Gen. Syst.* iii. 571 (*character erroneous*). I. memecylifolia, *Kurz in Journ. As. Soc.* 1872, ii. 316; *For. Fl.* ii. 24.

MARTABAN and TENASSERIM, *Wallich, Helfer, Kurz*; Moulmein, *Griffith.*

Doubtfully distinct from *I. nigricans* by the subsessile more oblong leaves, obtuse at both ends, with fewer nerves; the peculiar buds are identical. Kurz makes *I. erubescens* a var. of *nigricans*, distinguished by the obtuse corolla-lobes, but does not describe those of his *I. memecylifolia*, which is identical with Wallich's *erubescens*, and the corolla-lobes of which are exactly like that of *nigricans* proper.

IMPERFECTLY KNOWN, DOUBTFUL, AND REJECTED SPECIES.

I. GLAUCINA, *Kurz For. Fl.* ii. 27; glabrous, leaves 4–6 in. oblong to elliptic-lanceolate shortly acuminate, base acute, petiole ⅓–⅔ in., cymes corymbiform sessile, flowers crowded scarlet, calyx globose, teeth short triangular 2 acute 2 obtuse, corolla-tube 1½ in., lobes ovate-lanceolate acute.—Upper Tenasserim.

I. PANICULATA, *Hb. Rottler in Wall. Cat.* 6163; glabrous, slender, leaves 3–4 in. oblong obtuse thin, petiole very short, stipules short cuspidate, peduncles 3 in. slender, cymes brachiate, branches 1–2 in. slender shortly branched at the end, flowers few sessile and pedicelled, calyx-teeth minute acute, corolla-tube 1 in., lobes linear-oblong, mouth glabrous.—*Herb. Heyne*, from Rottler.—I think this is *I. oblonga*, Br., of Singapore and Java, whence possibly Rottler procured it.

I. WALLICHII, *W. & A. Prodr.* 428; *not of Wight Herb.* This is probably *I. cuneifolia.*

I. ATTENUATA, *Wall. Cat.* 6164, is *Chasalia curviflora, Thw.*

67. PAVETTA, *Linn.*

Characters of *Ixora*, but stipular bracts membranous, leaves usually more membranous, stipules more united into an intrapetiolar sheath, style much

longer, and ovules usually attached to a prominent placenta.—DISTRIB. Species about 60, in the tropics of the Old World.

Pavetta, as here limited, differs from *Ixora* in the usually membranous more or less sheathing stipulary bracts at the lower cyme branches, and the style twice as long as the corolla-tube with a slender entire rarely notched stigma, often more slender than the style itself. Various pentamerous species placed in *Pavetta* by authors are in this work referred to *Webera*, with which they agree in habit, and the short hairy style with a long fusiform grooved stigma.

* *Calyx-teeth much shorter than the ovary.*

1. **P. indica,** *Linn.*; *DC. Prodr.* iv. 490; glabrous pubescent or tomentose, leaves membranous elliptic elliptic-lanceolate obovate or oblanceolate rarely orbicular obtuse acute acuminate or caudate, cymes terminal sessile corymbiform, flowers pedicelled, calyx truncate or with very short triangular teeth, corolla-tube $\frac{1}{2}$–$\frac{3}{4}$ in.

Throughout India from the WESTERN HIMALAYA in GARWHAL (var. *tomentosa*), ascending to 4000 ft., to BHOTAN and BIRMA, and southwards to CEYLON, MALACCA, and PENANG.—DISTRIB. Malay Archipelago, S. China, N. Australia.

One of the most common and variable Indian small trees or bushes. *Leaves* pale or greenish when dry, 3–9 by $\frac{3}{4}$–3 in., a foot long in some Khasian specimens; petiole $\frac{1}{2}$–1$\frac{1}{2}$ in. stipules short, broad. *Cymes* 1–5 in. diam., rounded, or reduced to few scattered flowers; bracts broad, membranous, lower cupular; flowers on slender pedicels, white, rather fragrant. *Corolla-tube* twice or thrice as long as the oblong lobes. *Stigma* very slender, fusiform. *Berry* size of a pea, 2-seeded.—Flowers occasionally 5-merous (Wight & Arnott).

VAR. 1. *indica proper*; leaves glabrous beneath or nearly so, cymes glabrate, corolla glabrous. P. indica, *Linn.*; *Wall. Cat.* 6175, *excl. F.*; *W. & A. Prodr.* 431; *Wight Ic.* t. 148; *Thw. Enum.* 155; *Dalz. & Gibs. Bomb. Fl.* 112; *Brandis For. Fl.* 275. P. Finlaysoniana, *Wall. Cat.* 6177, and P. graciliflora, 6178. P. alba, *Vahl Symb.* iii. 11. P. petiolaris, *Wall. Cat.* 6186. Ixora paniculata, *Lamk. Dict.* iii. 344. I. Pavetta, *Roxb. Fl. Ind.* i. 385; *Kurz For. Fl.* ii. 18; *Rheede Hort. Mal.* xix. t. 10. Thwaites discriminates two varieties:—1. With few-flowered cymes, slender pedicels, and narrow lanceolate leaves; 2. With puberulous cymes and leaves pubescent beneath: both are found in Continental India, with many more founded on as slight characters. A third Ceylon one, *montana*, I have retained as distinct.

VAR. 2. *polyantha*; Wall Cat. 6176 (sp.); cymes pubescent, flowers densely crowded. P. indica, *Wall. Cat.* 6175 F.; *Bot. Reg.* t. 198. P. Rothiana, *DC. Prodr.* iv. 491; *W. & A. Prodr.* 431. P. villosa, *Heyne in Roth Nov. Sp.* 88, *not of Vahl.* Ixora tomentosa, *var.* glabrescens, *Kurz For. Fl.* ii. 19.

VAR. 3. *tomentosa*, Roxb. in Smith Cyclop. (sp.); leaves glabrous or softly or harshly puberulous above, beneath and the cymes pubescent tomentose or softly villous. I. tomentosa, *DC. Prodr.* iv. 490; *Heyne in Roth Nov. Sp.* 89; *W. & A. Prodr.* 431; ? *Thw. Enum.* 156; *Brand. For. Fl.* 275; *Wall. Cat.* 6173. P. Brunonis, *Wight Ic.* t. 1065. P. velutina, mollis, *and* canescens, *Wall. Cat.* 6174, 6179, 6181. Ixora tomentosa, *Roxb. Hort. Beng.* 11; *Fl. Ind.* i. 386; *Wight Ic.* t. 186; *Kurz For. Fl.* ii. 19.—As common and widely spread as var. 1, but less variable in form of leaf.

VAR. 4. *montana*, Thw. mss.; quite glabrous, leaves 2–3 in. coriaceous narrowly elliptic-oblong, tip rounded, corolla-tube $\frac{1}{4}$ in., style stout, stigma clavate.—Ceylon common, alt. 3–4000 ft., *Thwaites.*

VAR. 5. *minor*; quite glabrous, leaves small (2–4 in.) narrowly obovate or elliptic-lanceolate obtuse or acute, cymes terminal sessile corymbiform, calyx-teeth subulate acute, corolla $\frac{1}{3}$–$\frac{1}{2}$ in., stigma subclavate.—Shevagherry hills, *Wight* (Kew Distrib. 1483).—Looks different from *P. indica* in the smaller size of all its parts, acute calyx-teeth, and rather more clavate stigma.

2. **P. subcapitata,** *Hook. f.*; leaves elliptic-lanceolate caudate-acuminate finely pubescent beneath, cymes terminal sessile capitate many-flowered,

branches very short and sessile, flowers densely crowded, calyx puberulous, teeth very short, corolla glabrous, tube 1/3 in. Ixora subcapitata, *Wall. Cat.* 6160.

JYNTEA HILLS (east of the Khasia), *Gomez.*

Possibly a form of *P. indica*; if so a very distinct one, having the cymes contracted into a head; the leaves are 4–6 by 1½–2 in., and quite like those of *P. indica.*

3. **P. humilis,** *Hook. f.*; stem low simple or forked very robust hispidly hirsute above, internodes very short, leaves oblanceolate caudate-acuminate glabrous above pubescent beneath, cymes terminal sessile very short subcapitate, flowers densely crowded, calyx truncate or teeth very short obtuse, corolla glabrous, tube ½ in.

MALACCA, *Griffith* (Kew Distrib. 3007), *Maingay* (855).

Stem 1–2 ft. high, as thick as a goose-quill, suberect, rooting below, bark white; nodes with the cupular remains of coriaceous stipules. *Leaves* crowded, 5–7 by 1–2 in., narrowed into a short or long petiole, greenish when dry. *Cymes* about 1 in. diam.—The habit of this plant differs entirely from that of *P. indica.*

4. **P. hispidula,** *W. & A. Prodr.* 431; leaves glabrous or pubescent beneath narrowly or broadly lanceolate oblanceolate or elliptic membranous, cymes open, branches spreading, flowers pedicelled, calyx-teeth very shortly triangular, corolla-tube 1 in., glabrous.

WESTERN PENINSULA, or the Ghats from the Concan southwards. CEYLON, central province, alt. 3–5000 ft., *Walker*, &c.

There is little to distinguish this from some of the forms of *P. indica* but the usually much larger yellowish flowers, the more prominent calyx-teeth, and style often thickened towards the middle of the exserted portion. The specific name is badly chosen, as there is nothing hispidulous about it; the stigma described as slightly hispid is quite glabrous.

VAR. 1; leaves lanceolate and oblanceolate nearly glabrous above softly pubescent beneath black when dry. Courtallan and Quilon, *Wight. Beddome* (*Fl. Sylv. For. Man.* 134/7) includes this under *P. tomentosa*, and keeps var. *siphonantha* as a different species.

VAR. 2. *siphonantha*; leaves lanceolate and elliptic-lanceolate acuminate black when dry. P. siphonantha, *Dalz. in Hook. Kew Journ.* ii. 133 (sp.); *Dalz. & Gibs. Bomb. Fl.* 112; *Bedd. Fl. Sylv. For. Man.* 134/8.—Canara, *Dalzell.*

VAR. 3. *zeylanica*; leaves obovate or oblanceolate brownish pale when dry glabrous or sparingly pubescent beneath, cyme branches more robust and flowers larger, corolla-lobes sometimes ½–⅔ in. long obtuse or acute.—Ceylon.

VAR. 4. *angustifolia*; glabrous, leaves very narrowly lanceolate 4–6 by ½–¾ in. almost black when dry. P. angustifolia, *Thw. Enum.* 156; *Bedd. Ic. Pl. Ind. Or.* t. 99; *Fl. Sylv., For. Man.* 134/8.—Ceylon; banks of streams in the central province.

5. **P. breviflora,** *DC. Prodr.* iv. 491; glabrous, black when dry, leaves elliptic-obovate or oblanceolate acute or acuminate, cymes sessile or shortly peduncled small glabrate open brachiate, branches short stout, calyx cupular, teeth triangular, corolla glabrous, tube longer than the linear-oblong lobes, style thick shortly exserted. *Wight Ic.* t. 1035; *Bedd. Fl. Sylv. For. Man.* 134/7.

NILGHERRY HILLS; alt. 7000 ft., in woods, *Leschenaudt*, &c.

A bush, branches stout with yellow bark. *Leaves* 2–3 by ¾–1¼ in., narrowed into the petiole, shining above, with sometimes a few scattered hairs beneath; petiole ¼–¾ in. *Cymes* 1 in. diam., branches glabrous or pubescent; lower stipular bracts large, membranous. *Calyx-teeth* hirsute or glabrous. *Corolla* glabrous, rather fleshy, ⅓ in. diam. *Stigma* clavate, obtuse. *Seeds* subglobose with a narrow ventral slit opening into a large cavity.—This has quite the habit and short style of a *Webera*, but the stipular bracts and 4-merous flowers are those of *Pavetta*: it resembles *W. lucens*, but is distinguished at once by the glabrous style.

6. **P. naucleiflora,** *Wall. Cat.* 6171; densely pubescent, greenish when dry, leaves elliptic caudate-acuminate softly tomentose beneath, cymes open terminating long axillary naked branches with a pair of leaves at the top, peduncles and pedicels crowded hirsute with dense white spreading hairs, calyx-teeth subulate, corolla hairy or glabrous, tube ¾ in. twice as long as the lobes. *G. Don Gen. Syst.* iii. 575. Ixora naucleiflora, *Kurz For. Fl.* ii. 19.

BHOTAN; banks of the Kollery, alt. 2500 ft., *Griffith*. SILHET and PENANG, *Wallich*. TENASSERIM, *Helfer, Kurz*.

A shrub or tree. *Leaves* 4–6 by 1–2 in., with short scattered hairs above, petiole ½–1 in. *Cymes* sessile, 2–3 in. diam.; flowers very many, white, much like those of *P. indica*, var. *tomentosa*, of which it is perhaps only a form. *Fruit* hispid.

** *Calyx-teeth elongate, equalling or longer than the ovary.*

7. **P. involucrata,** *Thw. Enum.* 156; glabrous, almost black when dry, leaves elliptic obovate oblong or oblanceolate obtuse or subacute, cymes terminating axillary naked branches sessile capitate surrounded at the base by broad large sheathing stipular bracts, calyx-teeth equalling or longer than the ovary, corolla-lobes linear exceeding the tube, throat with a ring of hairs. *Bedd. Ic. Pl. Ind. Or.* t. 100; *Fl. Sylv. For. Man.* 134/7.

CEYLON; central province, alt. 5–7000 ft., *Walker*, &c.

A large shrub; branches robust, bark yellowish. *Leaves* 2–3 by 1–1½ in., thinly coriaceous, brown beneath when dry, narrowed into the short petiole. *Cymes* 1 in. diam., globose or compressed; branches 2–4 in., terminated usually by a pair of leaves; stipular bracts pale brown, often cuspidate; flowers sessile, white, densely crowded. *Calyx-teeth* ovate-lanceolate, ciliate, pubescent within. *Corolla-tube* ¼ in., campanulate, lobes acuminate. *Style* stout; stigma hardly thickened. *Fruit* smooth. *Seeds* orbicular, ventrally deeply hollowed.—This has the black look and short flowers of a *Webera*.

8. **P. Brunonis,** *Wall. Cat.* 6172; softly tomentose, greenish when dry, leaves obovate or oblanceolate obtuse or acute softly hirsute beneath, cymes terminal sessile contracted densely tomentose, branches 3 very stout short with a fastigate cluster of flowers, stipular bracts large, calyx-teeth lanceolate recurved, corolla glabrous, tube ½ in. twice as long as the lobes, stigma narrowly clavate.

NILGHERRY HILLS, *Noton, Wight, G. Thomson*.

This resembles *P. indica*, var. *tomentosa*, but the cymes are dense with short stout main branches, the calyx-teeth are entirely different, and the flowers are smaller. One of Wallich's specimens was received from Wight, but I find none in the Herbarium of the latter botanist, where the specimen named *Brunonis* has the truncate calyx and loose cyme of *P. indica*, var. *tomentosa*.

9. **P. Wightii,** *Hook. f.*; nearly glabrous, pale greenish when dry, leaves elliptic-lanceolate acute puberulous beneath with large oblong thickened glands, cymes terminating slender axillary naked branches open much divided glabrate, flowers long-pedicelled, calyx-teeth slender lanceolate acuminate longer than the ovary, corolla glabrous, tube ⅗ in. slender 2–3 times as long as the narrow acute lobes.

NILGHERRY HILLS, *Wight*.

This, but for the very long slender teeth of the calyx, would be put with *P. indica*. The slender naked axillary flowering branches are compressed, but not so much as in *P. involucrata*, and are 2–3 in. long; sometimes they are leafless at the summit, when the inflorescence appears peduncled and axillary. The calyx-teeth are erect and twice as long as the puberulous ovary, and the styles are very slender and glabrous. I have seen only one specimen.

10. **P. Gleniei,** *Thw. mss.*; glabrous or velvety, leaves elliptic-lanceolate or broadly elliptic obtuse or acute, cymes terminating axillary slender leafless

branches brachiate, calyx-teeth linear or filiform many times longer than the ovary persistent and exceeding the diameter of the fruit, corolla glabrous, tube $\frac{1}{3}$ in. twice as long as the lobes. I. tomentosa, *Thw. Enum.* 156.

CEYLON; at Damboul, and abundant in the Batticaloa district, *Walker, Thwaites.* Of this remarkable plant there are two forms, one quite glabrous, green when dry, with leaves 5 in. long; it is in fruit, and has very slender peduncles and pedicels, and filiform calyx-teeth nearly $\frac{1}{4}$ in. long crowning the ripe fruit; the other is more or less black when dry, softly velvety all over, with smaller broader leaves $2\frac{1}{2}$–3 in. long; it is in flower, and has shorter calyx-teeth in the fruit. Thwaites first regarded this as a form of *P. indica*, var. *tomentosa*, with longer calyx-teeth; but variable as that plant is, I have seen no specimen from any part of India with anything but very short triangular calyx-teeth, nor any with the inflorescence of this, in which the leaves at the end of the axillary flowering branches are wholly suppressed.

DOUBTFUL SPECIES.

P. COMPACTIFLORA, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 17 (Ixora); quite glabrous, leaves 3–5 in. elliptic to broadly lanceolate acuminate tapering into the stout petiole blackish when dry, flowers subsessile in dense involucred heads 1 in. diam. terminating axillary branches, involucrate bracts small inconspicuous broad ovate imbricate, calyx-teeth oblong rounded, corolla-tube $\frac{1}{4}$ in. rather wide, lobes oblong obtuse equalling the tube.—Upper Tenasserim, alt. 2000 ft., *Kurz.*—Possibly a *Webera*, though placed by Kurz along with tetramerous species.

P.? ARISTATA, *Wall. Cat.* 6169, from Tavoy; the specimens have no flowers; the name suggests its being possibly *Webera stellaris*, with which the foliage agrees, as do its 5 calyx-teeth.

P.? OBLONGA, *Wall. Cat.* 6170 ("Herb. Finlayson" from Siam?) is pentamerous and a *Webera.*

P.? COFFEACEA, *Wall. Cat.* 7290, is probably *Webera attenuata.*

68. **COFFEA,** *Linn.*

Shrubs, branchlets compressed. *Leaves* opposite, rarely in threes; stipules broad. *Flowers* in axillary fascicles or cymes or solitary, white or yellowish, often scented; bracteoles often connate. *Calyx-tube* short; limb short, often glandular, persistent. *Corolla-tube* short or long; lobes 4–7, spreading, twisted in bud. *Anthers* 4–7, sessile on the corolla-tube or throat, narrow, often recurved and twisted. *Ovary* 2-celled; style filiform, smooth, branches linear or subulate; ovules 1, peltately attached to the septum in each cell. *Drupe* with 2 plano-convex or ventrally concave coriaceous or cartilaginous pyrenes. *Seeds* plano-convex, concave or grooved ventrally, albumen horny; embryo short, towards the base of the seed, curved, cotyledons thin cordate, radicle inferior.—DISTRIB. Species about 20, in the tropics of the old world.

Coffea arabica, the coffee plant, is abundantly cultivated in various parts of Southern India.

SECT. I. **Eucoffea.** *Calyx-limb* irregularly few or many-toothed. *Corolla-tube* long, slender. *Fruit* didymous when 2-seeded. *Flowers* solitary or fascicled; lobes 5, rarely more, large, obtuse.

1. **C. bengalensis,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 540; glabrous, leaves broadly ovate or elliptic obtusely acuminate membranous not shining, flowers 1–3-nate 5-merous appearing before the leaves, calyx-limb many-toothed, corolla-tube $\frac{1}{2}$–$1\frac{1}{2}$ in., fruit ovoid-oblong. *Roth Nov. sp.* 148; *DC. Prodr.* iv. 499; *Wall. Cat.* 6244; *Wight & Arn. Prodr.* 435; *Brand. For. Fl.* 277; *Kurz For. Fl.* ii. 28; *Bot. Mag.* t. 4917. C. Horsfieldiana, *Miq. Fl. Ind. Bat.* ii. 308.

TROPICAL HIMALAYA, from Kumaon to Mishmi, ascending to 3000 ft. BENGAL, ASSAM, SILHET, CHITTAGONG, and TENASSERIM.—DISTRIB. Siam, Java.

A shrub with horizontal slender branches. *Leaves* deciduous, sometimes 5 by 3 in., but usually much smaller, membranous, green when dry, nerves beneath somewhat hairy, base rounded or acute, always shortly contracted into the short petiole; stipules subulate. *Flowers* axillary, pure white, fragrant, 1–1½ in. diam.; corolla-lobes obovate-oblong. *Calyx-limb* with many glandular teeth. *Fruit* ½ in. long, didymous when 2-seeded, "black, and size of a small cherry," *Roxb.*

2. **C. Wightiana,** *W. & A. Prodr.* 436; glabrous, leaves small subsessile ovate obtuse glabrous or woolly in the nerve-axils beneath, flowers subsolitary 5-merous appearing before the leaves, calyx-limb many-toothed, corolla-tube ½ in., fruit small broadly didymous. *Wight Ic.* t. 1598; *Wall. Cat.* 6246; *Thw. Enum.* 154.

WESTERN PENINSULA; in arid places from Kurg to Travancore, *Wight*, &c. CEYLON; in hot drier parts of the island.

A much branched almost spinescent shrub, with slender divaricate branches. *Leaves* ½–1½ in., rather coriaceous, pale when dry; stipules spinescent. *Flowers* white, with much narrower corolla-lobes than *C. bengalensis*. *Fruit* much broader than long, ⅓ in. diam., with a deep furrow between the lobes. Thwaites and Wight & Arnott regard this as a probable variety of *C. travancorensis*.

3. **C. travancorensis,** *W. & A. Prodr.* 435; glabrous or branches puberulous, leaves elliptic-lanceolate or broadly elliptic obtuse or obtusely caudate-acuminate, flowers 3–4-nate 5-merous appearing with the leaves, calyx-limb subentire or 2–3-toothed, corolla-tube ⅔–1 in., fruit broadly didymous.—*Wall. Cat.* 6245; *Thw. Enum.* 154. C. triflora, *Moon. Cat.* 15.

WESTERN PENINSULA; Travancore, *Wight*. CEYLON; in warm moist parts of the island, ascending to 3000 ft., *Thwaites*.

A bush. *Leaves* pale yellowish when dry, 3–4 by 1–1½ in., in Ceylon specimen very broadly orbicular-elliptic and 2¼ in. diam. *Flowers* much as in *C. bengalensis*, but smaller. *Fruit* broader than long, ⅓ in. diam.

4. **C. fragrans,** *Wall. mss.*; glabrous or branches puberulous, leaves elliptic-lanceolate obtuse or obtusely caudate-acuminate, flowers subsolitary 5-merous appearing with the leaves, calyx many-toothed, corolla-tube ⅔–1 in. Coffea, *Wall. Cat.* 8450.

SILHET, *Gomez*; TENASSERIM, *Helfer*; MERGUI, *Griffith*

Very similar indeed to *C. travancorensis*, and perhaps a variety of it, but the leaves are more shining, with the nerves more raised, and the calyx-limb, which is deeply cupped, is many-toothed. *Fruit* in Tenasserim examples ⅓ in. diam., broadly didymous, exactly as in *C. travancorensis*.

SECT. II. **Lachnostoma,** *Korth.* (Gen.) *Calyx-limb* regularly 4-toothed. *Corolla-tube* short; lobes 4, small, acute. *Fruit* glabrous or ellipsoid, not didymous when 2-seeded.—Flowers very small, in small axillary cymes.

5. **C. khasiana,** *Hook. f.*; branches and nerves beneath puberulous, leaves elliptic-lanceolate caudate-acuminate, base acute, nerves 7–8 pair, calyx-teeth 4 acute, corolla-tube equalling the lobes, mouth villous, lobes acute, fruit globose.—? Lachnostoma triflorum, *Korth. in Ned. Kruidk. Arch.* ii. 202; *Miq. Fl. Ind. Bat.* ii. 257. Coffea, No. 6, *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA MTS., alt. 2–4500 ft. frequent, *J. D. H. & T. T.*, *C. B. Clarke*.

A large rambling bush or small tree; branchlets with appressed hairs. *Leaves* greenish when dry, 3–8 by 1–3 in., membranous, not shining, nerves very oblique; petiole ¼ in.; stipules triangular, cusp long slender. *Flowers* in very short branched pubescent cymes; pedicels very short with a cup of connate bracteoles. *Calyx*

glabrous; teeth erect, triangular. *Corolla* $\frac{1}{10}$ in. yellowish; lobes short. *Style* short, arms linear. *Fruit* $\frac{1}{4}$ in. diam., smooth; calyx-teeth persistent. *Seeds* orbicular, ventrally concave.—The specimens seen of *Lachnostoma triflorum* are imperfect, and have smaller leaves than this, and the corolla is less hairy. *Coffea densiflora*, Blume, of Java and Sumatra, is evidently allied, but the description and our specimens are insufficient.

6. **C. Jenkinsii,** *Hook. f.*; glabrous, leaves elliptic-lanceolate caudate-acuminate, base acute, nerves 5–6 pair, calyx-teeth 4, corolla-tube longer than the lobes, mouth glabrate, lobes acute, fruit ellipsoid.

KHASIA MTS., alt. 3–4000 ft., *Jenkins*, *Griffith* (Kew Distrib. 3015).

Closely allied to *C. khasiana*, but almost entirely glabrous, the young shoots only puberulous, the leaves are narrower with fewer stronger nerves, the flowers are rather larger and the fruit and seeds quite different, the former being ellipsoid $\frac{1}{3}$ in. long, and the latter plano-convex.—This approaches *C. salicifolia*, Miquel, of Java. It is remarkable that no *Coffea* has been collected in the Malay Peninsula, though such near allies of this and *C. khasiana* inhabit Sumatra and Java.

TRIBE XII. MORINDEÆ.

69. MORINDA, *Linn.*

Erect or climbing shrubs or trees, branches terete or 4-gonous. *Leaves* opposite, rarely in threes; stipules connate, sheathing. *Flowers* in axillary or terminal simple panicled or umbellate peduncled heads, white, more or less connate by the calyces. *Calyx-tube* short; limb short or 0. *Corolla-tube* short or long; lobes 4–7, coriaceous, valvate in bud. *Stamens* 4–7, filaments short; anthers linear or oblong. *Ovary* 2- or spuriously 4-celled; style slender, branches long or short; ovules solitary, ascending from towards the base of the septum in each cell. *Fruit* compressed, formed of the succulent enlarged calyces enclosing many cartilaginous or bony 1-seeded pyrenes, which sometimes cohere into a 2–4-celled putamen; rarely of nearly free drupes. *Seeds* obovoid or reniform, testa membranous, albumen fleshy or horny; embryo terete, radicle inferior.—DISTRIB. Species about 40, all tropical.

* *Corolla 5–7-merous, tube long.*

1. **M. citrifolia,** *Linn.*; *DC. Prodr.* iv. 446; glabrous, leaves usually 6–10 in. broadly elliptic acuminate acute or obtuse shining, peduncles solitary leaf-opposed rarely 2–3-nate at the ends of the branches, flowers 5-merous, fruit of many drupes coalescent into a fleshy globose or ovoid head 1 in. diam.

Cultivated and wild? throughout the hotter parts of India and Ceylon. —DISTRIB. Malay Archipelago, Australia, Pacific Islands.

A small tree; trunk straight, bark smooth, branches obtusely 4-angled. *Leaves* shining, short-petioled, one of the pair next the peduncle often suppressed; stipules large, broadly oblong or semi-lunar, entire or 2–3-fid, glabrous. *Peduncles* usually in the axils of every other pair of leaves, 1 in. long or more. *Calyx-limb* truncate. *Corolla* white, tube $\frac{1}{2}$ in or less; lobes glabrous, fusiform in bud, throat pubescent. *Anthers* partly exserted. *Head* of fruit yellowish.—I have united *M. citrifolia* and *bracteata*, as this seems to meet the views of most Indian botanists, though Roxburgh, who alone seems to have studied these *Morindas*, keeps them apart, regarding *M. bracteata* as a native (of Ganjam, in Orissa). He, however, gives us other distinctive characters of the latter than the foliaceous calyx-lobes and included anthers (a sexual character). Thwaites regards *M. bracteata* as both wild and cultivated in Ceylon, and finds the presence of bracts inconstant. Both are regarded by others as cultivated forms of *M. tinctoria*, which, however, looks different. Rheede, whose figures Roxburgh quotes for *citrifolia*, represents the flower of the upper head as with calycine lobes.

VAR. 1. *citrifolia* proper; calyx-limb without a foliaceous lobe. M. citrifolia, *Linn.*; *Roxb. Fl. Ind.* i. 541; *Hunter in As. Res.* iv. 35; *Ham. in Trans. Linn. Soc.* xiii. 533; *W. & A. Prodr.* 419; *Wall. Cat.* 8418; *Dalz. & Gibs. Bomb. Fl.* 114; *Brand. For. Fl.* 277; *Kurz For. Fl.* ii. 60, var. 1; *Rheede Hort. Mal.* i. t. 52; *Gaertn. Fruct.* i. t. 29. —Truly wild in Malacca, *Maingay.*

VAR. 2. *bracteata*; stipules more acute, calyx-limb often with a lanceolate or spathulate white foliaceous lobe sometimes 3 in. long. M. bracteata, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 541; *Ham. in Trans. Linn. Soc.* xiii. 534; *DC. Prodr.* iv. 447; *W. & A. Prodr.* 419; *Wight Ill.* t. 126; *Wall. Cat.* 8419; *Thw. Enum.* 144; *Dalz. & Gibs. Bomb. Fl.* 114; *Brand. For. Fl.* 277.—Wild and cultivated in various parts of India and Ceylon. Not unfrequent in the forests of the Andamans, *Kurz*, who ascribes more acute stipules to this form and smaller fruit.

VAR. 3. *elliptica*; leaves 6–8 in. elliptic polished acuminate, nerves strong on both surfaces. Tavoy, *Gomez, Wall. Cat.* 8434. Concan, *Stocks.* Malacca, *Griffith.*—This looks intermediate between *angustifolia* and *citrifolia* in foliage. The drupes are partially free in the Tavoy specimen.

2. **M. tinctoria,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 543; leaves usually 4–8 in. broadly or narrowly elliptic acute at both ends, base very rarely cordate glabrous or pubescent or tomentose beneath or on both surfaces not shining, peduncles solitary or 2-nate leaf-opposed rarely terminal and panicled, flowers 5-merous, fruit of many drupes coalescent into a globose or ovoid fleshy head 1 in. diam. or less.

Throughout India from the Sutlej eastwards, and southwards to Ceylon and Malacca.—DISTRIB. Malay Archipelago.

Considered by many Indian botanists to be the wild form of *M. citrifolia*; but if *M. bracteata* is truly wild in India, as is asserted on good authority, it may be safer to regard *tinctoria* as a separate plant, characterised by its smaller foliage, which is never shining. The following are prevalent forms, but are neither constant nor always recognisable (in a dried state at any rate) from one another and from *M. citrifolia.*

VAR. 1. *tinctoria proper*; often shrubby, leaves glabrous rarely pubescent beneath, peduncles leaf-opposed. M. tinctoria, *Roxb. l. c.*; *DC. Prodr.* iv. 447; *W. & A. Prodr.* 419; *Brand. For. Fl.* 277. M. aspera, *W. & A. Prodr.* 420. M. Coreia *and* nodosa, *Ham. in Trans. Linn. Soc.* xiii. 537; *DC. l. c.* 448. M. leiantha, *Kurz in Journ. As. Soc.* 1872, ii. 313; *For. Fl.* ii. 59, M. citrifolia, *Bedd. Fl. Sylv.* t. 220. M. Zollingeriana *and* Teysmanniana, *Miq. Fl. Ind. Bat.* ii. 243, 244. Morinda, *Wall. Cat.* 8430.

VAR. 2. *tomentosa*; leaves tomentose on both surfaces, peduncles leaf-opposed. M. tomentosa, *Heyne in Roth Nov. Sp.* 147; *DC. l. c.* 448; *W. & A. Prodr.* 420; *Dalz. & Gibs. Bomb. Fl.* 114; *Kurz For. Fl.* ii. 60. M. Naudia *and* Chaenea, *Ham. in Trans. Linn. Soc.* xiii. 536. M. stenophylla, *Spr.*; *DC. and W. & A. ll. cc.* M. angustifolia, *Roth Nov. Sp.* 147, *not of Roxb.*

VAR. 3. *multiflora*; leaves glabrous or pubescent, peduncles axillary and terminal simple and paniculate. M. multiflora, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 546; *DC. Prodr.* iv. 447; *Brand. For. Fl.* 227.

VAR. 4. *aspera*; leaves lanceolate or elliptic-lanceolate acuminate and branches uniformly scabrid, stipules broad reflexed cleft to the base into two oblong obtuse lobes, peduncles leaf-opposed or axillary slender scabrid, corolla pubescent. M. aspera, *W. & A. Prodr.* 420. Morinda, *Wall. Cat.* 8429, *ex Herb. Wight.*

FORMA *exserta.* M. exserta, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 545; *DC. Prodr.* iv. 447; *Wall. Cat.* 8421; *W. & A. Prodr.* 419; *Brand. For. Fl.* 276; *Thw. Enum.* 145 and 430; *Kurz For. Fl.* ii. 59.—Under Roxburgh's descriptions and the above citations are included various forms of *Morinda* with exserted anthers, of which some are referable to *citrifolia* and others to the varieties of *tinctoria*; and as the character of the anthers is sexual, this form must be abandoned even as a variety, as Thwaites has pointed out.

3. **M. angustifolia,** *Roxb. Hort. Beng.* 15; *Cor. Pl.* t. 237; *Fl. Ind.* i. 547; glabrous, leaves large elliptic or obovate-lanceolate caudate-acuminate

tapering into the petiole, peduncles long or short solitary leaf-opposed rarely 2–3-nate and terminal, drupes free. *Wall. Cat.* 8420; *DC. Prodr.* iv. 447; *Kurz For. Fl.* ii. 61. M. squarrosa, *Ham. in Trans. Linn. Soc.* xiii. 535; *DC. l. c.* Morinda sp., *Wall. Cat.* 8423 *in part*, 8426, 8427, and Psychotria (? Morinda), 8365.

TROPICAL HIMALAYA, wild and cultivated, from Nipal eastwards, ascending to 6000 ft. in Sikkim. ASSAM and KHASIA MTS., ascending to 4000 ft. CHITTAGONG and TENASSERIM.

An erect bush or small tree. *Leaves* often a foot long, narrowed into a petiole sometimes 1½ in., glabrous or puberulous on the nerves beneath; stipules acute or obtuse, entire or 2-fid. *Flowers* very numerous, white, fragrant. *Corolla-tube* ⅔ in., glabrous; lobes globose in bud. *Fruit* 1 in. diam. or less; drupes turbinate, black.—Foliage often like that of *M. citrifolia.*

4. **M. persicæfolia,** *Ham. in Trans. Linn. Soc.* xiii. 535; glabrous or scaberulous, leaves obovate-lanceolate or oblanceolate or linear caudate-acuminate narrowed into the petiole, peduncles short solitary leaf-opposed, drupes coalescent. *DC. Prodr.* iv. 447; *Kurz For. Fl.* ii. 61. M. lanceolata, *Wall. Cat.* 8435.

CHITTAGONG and PEGU, *Hamilton, M'Clelland.* BIRMA, *Wallich.* TENASSERIM, in savannah forests, *Kurz.* SINGAPORE, *Maingay.*—DISTRIB. Sumatra, Siam.

A small low diffuse shrub; branches flexuous. *Leaves* 2–6 in., very variable in breadth, tapering into the slender petiole or rarely rounded at the base; stipules subulate. *Flowers* rather small, white. *Corolla* funnel-shaped, quite glabrous. *Fruit* the size of a cherry, smooth.—Leaves in Rangoon specimens very narrow 5 by ½ in.

** *Corolla 4- rarely 5-merous; tube short, not ¼ in.*

5. **M. umbellata,** *Linn.*; *DC. Prodr.* iv. 449; leaves membranous from broadly obovate to elliptic- or linear-lanceolate obtuse acute or caudate-acuminate glabrous pubescent or tomentose beneath, nerves very distinct, heads in terminal sessile umbels, drupes connate. *W. & A. Prodr.* 420; *Wall. Cat.* 8431; *Kurz For. Fl.* ii. 62. M. scandens, *Roxb. Fl. Ind.* i. 548; *DC. Prodr.* iv. 449. M. tetrandra, *Jack in Mal. Misc.* i. 13; *Wall. Cat.* 8432; *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 203; *DC. l. c.* M. Padavara, *Juss.* Morinda, *Wall. Cat.* 8429.—*Rheede Hort. Mal.* vii. t. 27.

Hills of EASTERN BENGAL and the MALAY PENINSULA, from the Khasia Mts., ascending to 4000 ft. to Penang and Singapore. WESTERN PENINSULA; South Concan, Nilgherry, and Travancore mts. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Archipelago, China, Japan, N. Australia.

A diffuse shrub, with sometimes tomentose climbing branches. *Leaves* extremely variable, rarely 5 in., sometimes obcuneate with a retuse apex, usually elliptic-lanceolate and quite glabrous, or scaberulous, or sometimes even softly tomentose beneath in both eastern and western specimens, narrowed into the slender petiole; stipules acute, connate. *Peduncles* 5–10, ½–1½ in., glabrous or tomentose. *Corolla* almost rotate, throat bearded. *Fruit* size of a large pea or larger, irregularly lobed.—Some Nilgherry Mt. specimens have the leaves not shining. A Singapore specimen from Dr. Anderson has leaves more coriaceous, softly villous beneath, with the nerves obscure on the upper surface, thus approaching *M. rigida*, but the nerves are distinct beneath, and the heads are those of *M. umbellata.*

6. **M. rigida,** *Miq. Fl. Ind. Bat.* ii. 246; leaves very coriaceous elliptic abruptly obtusely acuminate glossy above brown and sometimes puberulous beneath, nerves obscure on both surfaces, heads axillary solitary or 2–4-nate and terminal subsessile, drupes connate.

MALACCA, *Griffith, Maingay.*—DISTRIB. Sumatra, Borneo.

Branches cylindric, polished, glabrous. *Leaves* very uniform, 3–4 by 1½–2 in., dark

blackish-brown and highly polished above, rusty-brown and very opaque beneath, narrowed into a slender petiole; stipules connate, ovate. *Peduncles* stout, glabrous or pubescent. *Corolla-tube* $\frac{1}{8}$ in., puberulous. *Heads* 1 in. diam. and under, with few very large pyrenes.

7. **M. villosa,** *Hook. f.*; branches and leaves beneath hirsute, leaves elliptic-obovate or -lanceolate acuminate opaque and pubescent above, nerves distinct, peduncles terminal umbellate long or short; drupes confluent. Morinda? *Wall. Cat.* 8425.

KHASIA MTS., *De Silva*; at the Bor Panee river, *J. D. H. & T. T.*

A climbing shrub. *Leaves* greenish when dry, 3–4 by $1\frac{1}{4}$-$1\frac{1}{2}$ in., membranous; nerves numerous; petiole very short; stipules connate with subulate points. *Peduncles* $\frac{1}{2}$-2 in., stout or slender, villous. *Heads* in flower small. *Corolla* small, pubescent. *Fruit* 1 in., pale red.

DOUBTFUL SPECIES.

M. WALLICHII, *Kurz, For. Fl.* 61; a small quite glabrous evergreen tree?, leaves 3–5 in. oblong-lanceolate to linear acuminate at both ends pale beneath, petiole $\frac{1}{2}$-$1\frac{1}{2}$ in., flowers rather small white in small heads forming a terminal glabrous stiff-peduncled small cyme, calyx truncate, the tube (in bud) only $\frac{1}{4}$ in. long, lobes as long oblong-linear rather blunt.—Tenasserim, *Kurz.* Probably in the above description, copied from Kurz, the tube alluded to and lobes are those of the *corolla*, which word has been omitted accidentally.

70. RENNELLIA, *Korthals.*

Characters of *Morinda*, but the terminal heads few-flowered and paniculate, ovules peltate, and seeds orbicular thin and much dorsally compressed.—DISTRIB. Species 2 or 3, Malayan.

1. **R. speciosa,** *Hook. f. in Gen. Plant.* ii. 118; quite glabrous, leaves elliptic-lanceolate acuminate. Morinda speciosa, *Wall. Cat.* 8436; *Kurz For. Fl.* ii. 62.

TENASSERIM; Cheppedong hills, *Wallich.* MALACCA, *Griffith, Maingay.*

A stout evergreen climbing shrub. *Leaves* 6–9 by 2-$2\frac{1}{2}$ in., brown or pale green when dry, thinly coriaceous, tapering into a petiole $\frac{1}{2}$-1 in.; stipules free or connate, short. *Inflorescence* 1–3 in., erect, quite glabrous; peduncle rachis and short branches very stout; heads pedicelled, 3–6-flowered. *Calyx-limb* short, cupular, truncate. *Corolla-tube* $\frac{1}{2}$-$\frac{3}{4}$ in.; limb glabrous within, lobes linear-oblong. *Fruit* $\frac{1}{2}$ in. diam., globose.

71. DAMNACANTHUS, *Gaertn.*

A small rigid much-branched shrub covered with slender spines. *Leaves* small, subsessile, ovate, acuminate; stipules minute, 3-cuspidate. *Flowers* small, white, axillary, solitary or in pairs, pedicels short, bracteolate. *Calyx-tube* obovoid; limb 4–5-fid, persistent. *Corolla* funnel-shaped, throat villous; lobes 4–5, triangular-ovate, valvate in bud. *Stamens* 4–5, on the throat of the corolla; filaments short, anthers with a broad connective, exserted. *Ovary* 2–4-celled; style filiform, stigma 2–4-cleft; ovules 1 in each cell, pendulous by a broad base from above the middle of the septum. *Drupe* small, globose, with 1–4 hard plano-convex pyrenes. *Seeds* peltate, testa thin, albumen horny; embryo minute, radicle inferior.—DISTRIB. Species 1 or 2, East Bengal, China, and Japan.

1. **D. indicus,** *Gaertn. f. Fruct.* iii. 18, t. 182; *DC. Prodr.* iv. 473.

MISHMI HILLS (Upper Assam), *Griffith.*—DISTRIB. Japan.

Branches slender; spines straight, needle-like. *Leaves* $\frac{1}{2}$ in. long in Griffith's specimens, often longer in Japanese; nerves obscure. *Corolla-tube* $\frac{1}{4}$ in., segments

half as long. *Fruit* ⅛ in. diam.—Griffith's is the only Indian specimen I have seen, and no further habitat is given than Mishmi. Considering the confusion in which Griffith's collections were when received at Kew, the locality may be doubtful, and the specimen a Garden one: it is an extensively cultivated plant, but being Chinese, may be indigenous in Mishmi.

72. PRISMATOMERIS, *Thwaites.*

Shrubs with compressed 4-gonous branches. *Leaves* opposite; stipules 1–2-cuspidate. *Flowers* unisexual, in axillary and terminal fascicles, white. *Calyx-tube* of ♂ small, turbinate; of ♀ larger, cupular, persistent. *Corolla-tube* cylindric, throat glabrous; lobes 4–5 spreading, valvate in bud. *Stamens* 4–5, in the corolla-tube; filaments short; anthers linear, included. *Ovary* 2-celled; style filiform, branches 2 free or united; ovules 1 attached above the middle of the septum in each cell. *Berry* small, 1–2-celled, 1–2-seeded. *Seeds* subglobose, peltate, ventrally excavated, testa membranous; embryo small, cotyledon reniform, radicle inferior.—DISTRIB. 2–3 species, tropical Indian and Malayan.

1. **P. albidiflora,** *Thw. in Hook. Kew Journ.* viii. 268, t. vii.; *Enum.* 154, 421; leaves elliptic or elliptic-lanceolate shining. *Bedd. Ic. Pl. Ind. Or.* t. 93; and *Anal. Gen.* t. 29, f. 4. Coffea tetrandra, *Roxb. Fl. Ind.* i. 538; *Wall. Cat.* 6242; *DC. Prodr.* iv. 499; *Kurz For. Fl.* ii. 28. Rubiæ, *Wall. Cat.* 8470.

KHASIA MTS., ascending to 4000 ft., and southwards to MALACCA. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Archipelago.

An evergreen tree or shrub; branches slender, 4-gonous; bark yellow, polished. *Leaves* pale when dry, 3–5 by 1–1½ in., coriaceous; nerves slender; petiole ½–1 in.; stipules triangular, acuminate. *Flowers* subumbellately fascicled, rarely in peduncled axillary umbels, pedicels filiform, ½–1 in., ebracteolate. *Calyx-limb* truncate. *Corolla* white, tube ¾–1 in.; lobes linear-oblong. *Fruit* globose, ¼ in. diam.

2. **P. Fergusonii,** *Thw. mss.*; *Bedd. Fl. Sylv., For. Man.* 134, 10; very similar to *P. albidiflora*, but leaves rather larger, pedicels shorter all terminal and more numerous and the corolla much less fleshy.

CEYLON, near Colombo.

The above is all the information I have as to this species, except an observation by Beddome, that "the imbrication of the corolla-lobes is easily seen in this species." In reference to this point, Beddome also says in the generic character, "Corolla-lobes subimbricate (or valvate?)." Finding the corolla to be strictly valvate in *P. albidiflora*, as Thwaites first described it, I suspect *P. Fergusonii* may not be congeneric.

73. CŒLOSPERMUM, *Blume.*

Scandent glabrous trees or shrubs; branchlets compressed. *Leaves* opposite; stipules connate, rarely free. *Flowers* in terminal cymose thyrsoid or panicled cymes, white or yellowish, often scented. *Calyx-tube* short; limb short, persistent. *Corolla* coriaceous, funnel- or salver-shaped; lobes 4–5, narrow, spreading or reflexed, valvate. *Stamens* 4–5, on the throat of the corolla, filaments filiform; anthers versatile, exserted, slender. *Ovary* 2 or 4-celled; style filiform, branches 2 short or long; ovules 1 in the 4-celled, geminate in the 2-celled ovaries, pendulous. *Drupe* globose, with 2–4 pyrenes. *Seeds* erect. —DISTRIB. Species 4–5, Malayan and Australian.

1. **C. scandens,** *Blume Bijd.* 994; leaves broadly elliptic acuminate coriaceous. *DC. Prodr.* iv. 468.

MALACCA, *Griffith* (Kew Distrib. 3087), *Maingay* (933).—DISTRIB. Malay Archipelago.

A climber; branches cylindric, smooth. *Leaves* 4–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., opaque or shining above, base acute or rounded, not narrowed into the petiole; nerves faint, spreading and arched; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules triangular. *Cymes* 2–5 in., umbellately branched, puberulous; pedicels umbellate, $\frac{1}{8}$ in.; bracteoles minute. *Corolla* white, tube $\frac{1}{4}$ in., hairy within; segments narrow, yellow, pubescent on the inner face.—I have seen only flowers and fruit of an authentic specimen of *C. scandens*, and have no reason to doubt its identity with this, it being a widely diffused Malayan plant likely to occur at Malacca. The structure of the ovary is difficult to observe in dried specimens. I find 4 1-ovuled cells in one specimen, 2 1-ovuled cells in most, 2 2-ovuled cells in an authentic specimen, and Maingay says ovary by abortion 2–3-celled. In the Australian *C. paniculatum* and *reticulatum* I find the ovary 4-celled above, 2-celled below, with 2 ovules in each cell.

74. GYNOCHTHODES, *Blume.*

Twining glabrous shrubs; branches terete. *Leaves* opposite, coriaceous; stipules broad, acute. *Flowers* small, unisexual, in axillary cymose fascicles or peduncled heads; pedicels short; bracts deciduous. *Calyx-tube* small, turbinate; limb annular truncate or 5-toothed, persistent. *Corolla* coriaceous, tube short, throat woolly; lobes 4–5, oblong-lanceolate, valvate in bud with inflexed tips. *Stamens* 4–5, in the corolla-tube, filaments stout; anthers linear-oblong, exserted. *Ovary* 4-celled; style of ♂ entire, of ♀ stout, branches oblong; ovules 1 in each cell, attached to the inner angle by a broad base. *Drupe* globose, with 2–4 pyrenes. *Seeds* compressed, ascending, testa membranous; embryo basal, small, radicle inferior.—DISTRIB. Species 3 or 4, all Malayan.

1. **G. sublanceolata,** *Miq. Fl. Ind. Bat. Suppl.* 548; branches slender twining, leaves elliptic-lanceolate acuminate, nerves very indistinct, fruit the size of a pea. G. coriacea var., *Miq. in Ann. Mus. Lugd. Bat.* iv. 244. Pæderia tetrandra, *Wall. Cat.* 6249. ? Psychotria, *Wall. Cat.* 8385. ? Rubiaceæ, *Wall. Cat.* 8297.

MALACCA, SINGAPORE, and PENANG, *Wallich, Maingay.* (*G. coriacea*, Kew Distrib.) —DISTRIB. Bangka.

Branches with long almost filiform tips, their nodes sometimes leafless but with triangular stipules. *Leaves* black when dry, 3–4 by $\frac{1}{2}$–1 in., not shining, base narrowed into the petiole; nerves without axillary glands; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* fascicled or in much reduced cymes. *Corolla-tube* very short, woolly within. *Style* glabrous. *Fruit* with 3–4 pyrenes.—Wallich's 8385 is possibly a young state of this, the branches root like ivy, and the distichous leaves are sessile, linear-oblong, acute, with cordate bases; it has neither flower nor fruit. Miquel has (in the Annales) reduced this to a variety of *G. coriacea*, which appears to me to be an entirely different plant.

2. **G. macrophylla,** *Kurz in Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 33; leaves elliptic-oblong subacute or obtuse, fruit the size of a cherry.

SOUTH ANDAMAN ISLAND and MALACCA, *Kurz, Maingay* (Kew Distrib. 934).

Branches stout. *Leaves* brown when dry, 4–6 by 2 in., tip rounded, base subacute, very coriaceous, opaque, with nerves slender in Kurz's specimen, shining above, with very distinct nerves in Maingay's. *Flowers* very numerous, larger than is *G. sublanceolata*; calyx-tube more distinct; corolla-lobes longer. *Fruit* sea-green.—I have seen no Andaman specimen, and only one of Kurz's, sent by Dr. King, and marked as from Nankoury, Malacca; it has leaves of the colour and texture of *G. sublanceolata*, and wants the hollow fringed glands in the nerve axils described by Kurz; these are present in none of the axils of Maingay's specimen, the leaves of which are brown and shining above.

TRIBE XIII. **PSYCHOTRIEÆ.**

75. **PSYCHOTRIA,** *Linn.*

Shrubs or small trees, rarely herbs, erect, rarely climbing or twining. *Leaves* opposite, very rarely in whorls of 3 or 4; stipules intrapetiolar, often connate, solitary or in pairs, with often glandular axillary hairs. *Flowers* in terminal (rarely axillary) cymes, heads or fascicles, not involucrate (in Indian species), bracteate or not. *Calyx-tube* short, limb often deciduous. *Corolla-tube* straight, short (in Indian species), throat naked or hairy; lobes 5, rarely 4 or 6, valvate in bud. *Stamens* as many, on the corolla-throat or mouth, filaments short or long; anthers included or not. *Ovary* 2-celled; style short or long, branches 2; ovules 1 basal erect in each cell, usually cuneiform. *Fruit* small, ovoid, globose or oblong, rarely didymous with two 1-seeded plano-convex pyrenes, rarely separating into 2 cocci. *Seeds* plano-convex, ventrally flat or grooved, testa thin, albumen hard sometimes ruminate; embryo small, basal, cotyledons broad thin, radicle inferior.—DISTRIB. Species about 500, all tropical or subtropical.

SECT. I. *Seeds* semi-terete or plano-convex, dorsally smooth and convex, ventrally flat without any groove; albumen strongly ruminated.—Corolla-tube very short in all but *P. platyneura* and *malayana*. (GRUMILEA, *Gaertn.*)

* *All or lower branches of the cymes whorled, very rarely* (*in* P. congesta) *opposite, in* P. Thwaitesii, *sometimes capitate* (see also 15. *P. malayana*).

1. **P. stenophylla.** *Thw. Enum.* 147 (Grumilea); glabrous, leaves narrowly linear-lanceolate, stipules broad nearly orbicular obtuse coriaceous concave, cymes peduncled, branches whorled, flowers small capitate.

CEYLON; at no great elevation, *Thwaites.*

Branches compressed, leaf-axils and nodes of cyme glandular and with ferruginous hairs. *Leaves* green when dry, coriaceous, 2–6 by ½–1 in., midrib yellow very prominent and grooved on the upper surface, nerves slender; petiole short; stipules deciduous. *Cymes* with 5 branches in a whorl, each ½ in. long; heads of minute flowers ⅓ in. diam. *Calyx-limb* sinuate. *Corolla-tube* very short, throat bearded. *Fruit* size of a pea, globose, black, smooth.—I follow Thwaites in placing this amongst the *Grumilieæ*, having seen no fruit.

2. **P. glandulifera,** *Thw. mss.*; glabrous, leaves elliptic-oblong abruptly acuminate narrowed into the petiole, axillary nerve-glands large and deep, stipules broad very obtuse, cymes very short subsessile ebracteolate 3-chotomous, flowers small crowded.

CEYLON, *Thwaites.*

Branches terete. *Leaves* 5–7 by 1½–2½ in., pale green when dry, coriaceous, nerves 9–10 pair, spreading, arched; petiole ½–1 in.; stipules coriaceous, deciduous. *Cymes* (young) 1 in.; branches very stout. *Flowers* (in young bud only) small, sessile; calyx-limb hardly toothed.—The specimens are very imperfect, and I follow Thwaites in placing it amongst the *Grumilieæ.*

3. **P. Gardneri,** *Thw. Enum.* 147 (Grumilea); glabrous, leaves cuneate-obovate the broad end very suddenly contracted into a broad caudate obtuse tip, nerves 14–18 pair, stipules obtuse, cymes peduncled brachiate, branches whorled, flowers capitate.

CEYLON; central province, alt. 3–6000 ft., *Gardner*, &c.

Branches stout, compressed, smooth. *Leaves* 4–8 by 1½–2½ in., coriaceous, pale brownish green when dry, narrowed into the short stout petiole; nerves spreading,

axils sometimes minutely glandular; stipules ovate, obtuse, deciduous. *Cymes* broad; peduncles 1–2 in., and branches stout; bracteoles rounded; flowers 3-4-nate, subsessile. *Calyx* obscurely 5-toothed. *Corolla-tube* very short. *Fruit* small, spherical, smooth. *Seed* ½-terete; ventral surface flat; albumen ruminate.

4. **P. Thwaitesii,** *Hook. f.*; glabrous, leaves elliptic-lanceolate oblong or obovate acuminate or acute, nerves 12–16 pair, stipules triangular acute or cuspidate, cymes peduncled, branches stout whorled, flowers capitate or cymes sessile reduced and capitate mixed with rufous hairs, calyx-limb in the ellipsoid fruit minute. P. Heyneana, *Wall. Cat.* 8327; *upper right hand specimens.* Grumilea nudiflora, *Thw. Enum.* 147, *not of W. & A.* ? G. nigra, *Gaertn. Fruct.* 138, t. 28.

WESTERN PENINSULA; on the Ghats, from the Concan southward. CEYLON; alt. 3–6000 ft., common.

A glabrous bush; branches smooth, compressed. *Leaves* 3–6 by 1½–2½ in., greenish when dry, rather coriaceous; petiole ⅓–1⅓ in.; stipules very variable. *Cymes* variable; peduncle and short branches 4-angled in fruit; bracteoles caducous; flowers small. *Calyx-teeth* 5, small. *Corolla-tube* very short, glabrous externally and nearly so within. *Fruit* ellipsoid, smooth. *Seed* ½-terete; ventral surface flat; albumen ruminate.—There are two principal forms of this and a subordinate third.

VAR. 1. *zeylanica*; cymes peduncled, branches distinct.

VAR. 2. *peninsularis*; leaves usually smaller more obovate, cymes always sessile, branches moderate or short or 0, or the inflorescence a peduncled globose head.

VAR. 3. *coronata*; leaves small, fruit with the calyx-limb distinct 5-toothed (as in *P. congesta*, but smaller).—Ceylon at Ramboddi, alt. 4000 ft., *Gardner.*

5. **P. congesta,** *W. & A. Prodr.* 432; glabrous, leaves obovate or oblanceolate subacute, nerves 8–10 pair, stipules ovate, cymes sessile or peduncled, branches opposite, flowers crowded very shortly pedicelled not capitate without rufous hairs, calyx-limb crowning the ellipsoid fruit. *Wight Ic.* t. 1037. G. patens, *Schlecht in Pl. Hohen. n.* 1373. ? P. elongata, *Bedd. Fl. Sylv. Anal. Gen.* t. xvii.

NILGHERRY and PULNEY MTS.; alt. 7–8000 ft., *Wight*, &c.

An evergreen leafy bush. *Leaves* 2½–5 by 1–2 in., rather coriaceous, greenish when dry; nerves strong; petiole ¼–¾ in.; stipules deciduous. *Cymes* with short thick branches and branchlets, quite glabrous, ebracteolate. *Calyx* 4–5-toothed. *Corolla-tube* very short, glabrous or pubescent within. *Fruit* ellipsoid, smooth; calyx-limb tubular, toothed, sometimes very low or even reduced to teeth sessile on the top of the fruit. *Seed* semiterete, ventral face flat, albumen grooved.

VAR. *astephana*; cymes less crowded, fruit with a scarcely raised calyx-limb.

6. **P. macrocarpa,** *Hook. f.*; glabrous, leaves elliptic or oblanceolate obtuse or obtusely acuminate, stipules very broad, cymes peduncled, branches very short and thick lower whorled, flowers crowded very shortly pedicelled, fruit ellipsoid ⅝ in. crowned by the very short calyx-teeth. Rubiacea, *Wall. Cat.* 8460.

TRAVANCORE; at Courtallam, *Wight.*

Branches pale, smooth, branchlets compressed. *Leaves* 5–8 by 2–2½ in., thinly coriaceous, narrowed into a rather slender petiole ½–1 in.; stipules coriaceous, deciduous. *Cymes* short, not 1 in. high and hardly so broad; peduncles 1 in. or less; bracts caducous; flowers larger than in the preceding species. *Calyx-teeth* 4–5, triangular. *Corolla-tube* very short, woolly within. *Fruit* ellipsoid, smooth. *Seeds* ½-terete, ventral face flat; albumen ruminate.

7. **P. subintegra,** *W. & A. Prodr.* 432 (Grumilea); glabrous, leaves elliptic-lanceolate obtuse or obtusely acuminate, petiole slender, stipules very broad, cymes axillary and terminal peduncled brachiate broadly corymbose,

lower pair of branches long spreading rachis above them arrested, flowers in many small heads terminating the branchlets, fruit globose areole small. Psychotria? *Wall. Cat.* 8345.

WESTERN PENINSULA; Shevagherry and Dindygul hills, *Wight.*

Branches stout, smooth. *Leaves* 6–8 by 2–3 in., green and rather flaccid when dry, base narrowed into a petiole ½–1½ in.; nerves distant, about 10 pair; stipules caducous, variable, sometimes toothed. *Cymes* large, 3–4 in. diam.; peduncles stout, 3 in. and less, lower pair of branches ascending or recurved branched at the end, and bearing small heads ⅙–¼ in. diam. of glabrous flowers; bracts caducous. *Calyx-limb* membranous, teeth very short, obtuse or acute. *Corolla-tube* broadly shortly funnel-shaped, mouth villous. *Fruit* ⅕ in. diam., smooth. *Seed* ½-terete, ventral face flat, albumen ruminated.—Wight's originally distributed specimens have a terminal cyme, with an elongated rachis; all the numerous others have the rachis exceeded in height by the ends of the lower branches of the cyme.

8. **P. truncata,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 162; glabrous, leaves large cuneate-obovate or orbicular rarely elliptic-obovate abruptly apiculate coriaceous base cuneate, nerves 14–16 pair close and strong, stipules very large, cymes peduncled or sessile brachiate, lower branches whorled, berry ellipsoid. P. Heyneana, *Wall. Cat.* 8327, *in part.*

WESTERN PENINSULA; on the Ghats from Concan southwards, *Heyne*, &c.

Branches stout, smooth. *Leaves* 6–8 by 3–4 in., pale green when dry, narrowed into a stout petiole ½–1½ in., upper surface usually raised between the spreading nerves; stipules sometimes 1½ in., broadly ovate or oblong, free or connate below, coriaceous. *Cymes* terminal, often short and dense in flower, in fruit 5–6 in. diam., stout, 3 in. and under; branches long or short; bracts deciduous; flowers small, subsessile. *Calyx-limb* truncate. *Corolla-tube* very short, glabrous, mouth with a fringe of hairs. *Berry* ⅓ in., smooth. *Seed* ½-terete, ventral face flat; albumen ruminate.—The ticket of Heyne marked March 20, 1837, identifies the *H. Heyneana* of Wallich's catalogue with the *H. truncata* of his and Carey's edition of the "Flora Indica."

9. **P. Dalzellii,** *Hook. f.*; glabrous, very robust, leaves obovate or oblong- or obcuneate-obovate coriaceous tip obtuse or rounded, base cuneate, nerves 12–20 pair strong, stipules very large, cymes terminal peduncled brachiate, branches whorled very stout with terminal capitate flowers, and large persistent bracts. P. bracteata, *W. & A. Prodr.* 434, *not of DC.*

WESTERN PENINSULA; from Canara southwards.

Branches sometimes as thick as the little finger, smooth, cylindric. *Leaves* 5–10 by 2–4 in., pale or black when dry, nerves strong on both surfaces; petiole very short, stout; stipules broadly oblong or orbicular, coriaceous, sometimes ⅔ in. diam., axils glabrous. *Cyme-peduncle* 3 in. or less, lower branches 4–5 in a whorl, 1–2 in.; bracts ¼–½ in., broadly ovate or orbicular, very coriaceous; bracteoles concave as long as and forming an involucre round the heads of flowers. *Calyx-teeth* 5, short, rounded, ciliate. *Corolla-tube* ⅛ in., glabrous, throat villous. *Fruit* young, glabrous, crowned with the enlarged calyx-limb.—Dalzell has called this a *Grumilea.* I have seen no ripe fruit.

** *Cyme-branches opposite, whorled in* 15. P. malayana.

10. **P. elongata,** *Wight Ic.* t. 1036 (Grumilea); glabrous, leaves elliptic or obovate obtuse subacute or cuspidate, base cuneate, nerves 10–14 pair, axils sometimes perforated, uppermost stipules connate obtuse, cymes terminal, fruiting elongate racemiform, branches very short opposite and peduncles very stout, flowers crowded, fruit globose, calyx-limb minute. Psychotria, *Wall. Cat.* 8350.

NILGHERRY and SHEVAGHERRY HILLS, *Noton*, &c. CEYLON; Central Province, alt. 7000 ft., *Thwaites.*

Shrubby. *Leaves* 3–5 by 1½–2½ in., pale when dry; nerves slender, spreading;

petiole very short; stipules forming a sheathing 2-fid tube to the peduncle, obtuse or subacute, axils glabrous. *Cymes* 2–3 in. long in fruit; peduncle 2 in. and under, stout; branches not $\frac{1}{6}$ in., bracts caducous; flowers sessile or very shortly pedicelled. *Calyx* minutely 5-toothed. *Corolla-tube* very short, throat villous. *Fruit* size of a small pea; calyx-limb obsolete. *Seeds* $\frac{1}{2}$-terete, ventral face flat; albumen ruminated.—Leaves of the Ceylon specimen broader and with more nerves than the peninsular. Beddome's figure of *P. elongata* (Fl. Sylv. Anal. Gen. xvii. f. 6) has glabrous throat to the corolla, and is a different plant. From the appearance of the inflorescence and persistent large calyx-limb it is probably *P. congesta*.

11. **P. adenophylla,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 166; *Cat.* 8349; glabrous, leaves elliptic-lanceolate or oblong acute acuminate or cuspidate, nerves 14–20 pair, axils minutely perforated, upper stipules connate sheathing truncate, axils hairy, cymes terminal rarely axillary fruiting elongate racemiform, branches short opposite and slender, flowers pedicelled, fruit pyriform, calyx-limb minute. *DC. Prodr.* iv. 520. P. connata, *Kurz For. Fl.* ii. 10, *not of Wallich.*

KHASIA MTS. and CACHAR, alt. 0–4000 ft. PEGU, *M'Clelland*; CHITTAGONG, *J. D. H. & T. T.*; TENASSERIM and ANDAMAN ISLANDS, *Helfer. Kurz*, &c.

A shrub. *Leaves* very variable, 4–7 by 1–2½ in., tip rounded and cuspidate or more or less gradually acuminate, base the same; nerves variable in number; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in., truncate, obtuse or subacute. *Cymes* with the peduncle 3–5 in., or 7 when fruiting; branches opposite and subopposite; bracts caducous; flowers very small. *Calyx-limb* truncate, quite entire. *Corolla-tube* $\frac{1}{16}$ in., throat villous. *Fruit* $\frac{1}{4}$ in. long. *Seeds* $\frac{1}{2}$-terete, ventral face flat; albumen ruminate.—Very different from *P. congesta* in the shape of the leaves, slender cymes, flowers, calyx-limb, and fruit. The hollow glands at the nerve-axils from which Wallich derived the specific name are minute and not always visible.

12. **P. tylophora,** *Kurz in Lond. Journ. Bot.* 1875, 328; glabrous, leaves elliptic-obovate or -lanceolate abruptly acuminate narrowed into the petiole, nerves 12–16 pair axils perforate, stipules ovate-oblong acute, cymes peduncled terminal erect, rachis slender elongate, opposite and alternate short branches slender, fruit ellipsoid pedicelled, calyx-limb minute.

NICOBAR ISLANDS; woods of Katchall, *Kurz.*

A shrub. *Leaves* 4–7 by 1½–2½ in., rather membranous, pale when dry; nerves slender, arched; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules glabrous, axils hairy. *Cymes* racemose in fruit, 3–4 in. long, short, branches dichotomously divided. *Fruit* nearly $\frac{1}{2}$ in. long.—I have seen but one imperfect specimen.

13. **P. pendula,** *Hook. f.*; glabrous, leaves elliptic-obovate or -lanceolate abruptly obtusely acuminate, narrowed into the petiole, nerves 12–16 pair, axils imperforate, cymes peduncled terminal, fruiting pendulous very long, rachis and very short distant opposite branches stout, fruit depressed-globose sessile crowned with the enlarged calyx-limb.

ANDAMAN ISLANDS; Passage Bay, *Helfer.*

Branches smooth, stout, pale green. *Leaves* 4–6 by 1¾–2½ in., pale green when dry, nerves slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules not seen. *Fruiting cymes* racemose, 5–7 in. long. *Fruit* $\frac{1}{3}$ in. broad, somewhat contracted at the base, obscurely didymous; calyx-limb cupular, 5-toothed, with a central obtuse projecting enlarged disk. *Seeds* hemispheric, ventral face flat; albumen not deeply ruminate.—This differs from *P. tylophora* in the imperforate nerve-axils and long pendulous fruiting cymes with very stout branches, and sessile fruit of a totally different shape, and large calyx-limb.

14. **P. platyneura,** *Kurz in Trimen Journ. Bot.* 1875, 327; *For. Fl.* ii. 10; glabrous, leaves elliptic-obovate or -lanceolate abruptly acuminate narrowed into the stout petiole, nerves about 20 pair, stipules broad ovate upper

obtuse, cymes terminal, peduncle and subopposite corymbose branches stout, flowers pedicelled, fruit large subglobose, calyx-limb very small.

ANDAMAN ISLANDS, *Kurz.*

A shrub. *Leaves* 6–7 by $1\frac{3}{4}$–$2\frac{1}{2}$ in., thinly coriaceous, dull green when dry, nerves slender; petiole $\frac{1}{2}$–1 in. *Cymes* 1–2 in.; branches subopposite, short, dichotomously divided; pedicels stout. *Calyx-teeth* 5, minute. *Corolla* small. *Fruit* $\frac{1}{3}$ in. long, slightly obovoid, base suddenly contracted. *Seeds* $\frac{1}{2}$-terete,, ventral face flat; albumen ruminate.—The seeds are not very satisfactory.

15. **P. malayana,** *Jack in Mal. Misc.* i. 3; glabrous, branches robust, leaves elliptic-lanceolate acute or acuminate, nerves 12–16 pair, axils imperforate, stipules large acute or upper apiculate, cymes terminal peduncled many-flowered, branches stout lower or all whorled and with whorled branchlets, flowers pedicelled and sessile in the forks, corolla-tube elongate. *DC. Prodr.* iv. 520. P. aurantiaca, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 165; *Cat.* 8335; *DC. l. c.* 519. P. expansa, *Blume Bijd.* 963; *DC. l. c.* 521. Grumilea aurantiaca (*excl. descript. of fruit*) *and* Chasalia expansa, *Miq. Fl. Ind. Bat.* ii. 296 and 281.

PENANG, *Jack.*—DISTRIB. Java.

Branches soft, smooth, upper compressed. *Leaves* 4–8 by $1\frac{1}{2}$–3 in., greenish when dry, nerves slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules coriaceous. *Cymes* stout, puberulous or glabrous, very many-flowered; peduncle 3 in. and less, and branches angled or compressed; bracteoles caducous. *Calyx-limb* truncate, obscurely 5-toothed. *Corolla-tube* $\frac{1}{4}$ in., lobes lanceolate, and throat villous. *Fruit* "obovoid, as large as a cherry stone, orange-coloured," *Wallich.*—Jack's description is too imperfect for identification, but as Wallich has his *aurantiaca* from Jack, there is little room for doubt as to this being his species. I have seen no fruit, but that of a very similar Bornean species differing only in the opposite cyme branches is that of a *Grumilea.* Some of Miquel's synonyms are too unsatisfactory to be quoted: his *G. aurantiaca* is described as having 10-ribbed fruit; of the loose fruits transmitted with his *Chasalia expansa* to Herb. Kew, one is 10-ribbed, and does not, I suspect, belong to the plant.

16. **P. polycarpa,** *Miq. Fl. Ind. Bat.* ii. 295 (Grumilea); scandent, glabrous, leaves obovate or elliptic-obovate acute or abruptly acuminate, nerves 5–7, axils imperforate, cymes terminal brachiate, branches elongate, branchlets divaricate, flowers pedicelled, fruit very small ellipsoid umbonate. P. obovata, *Wall. Cat.* 8380 A.

MALACCA, *Griffith* (Kew Distrib. 3042), *Maingay* (924); SINGAPORE, *Wallich.*—DISTRIB. Sumatra.

Branches soft, cylindric, smooth. *Leaves* $2\frac{1}{2}$–3 in., variable in width, dull greenish when dry, coriaceous, nerves indistinct, veins 0; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules ovate, obtuse, caducous. *Cyme* much corymbosely branched, sometimes 6 in. diam.; peduncle 3 in. and less, and the branches angled; flowers very small, on divaricating pedicels. *Calyx-limb* truncate. *Corolla* $\frac{1}{12}$ in., throat villous. *Fruit* $\frac{1}{8}$ in. long; calyx-limb depressed, surrounding the prominent exserted obtuse stout disk, as in *P. pendula.*—This species, notwithstanding its ruminated albumen and $\frac{1}{2}$-terete seed, must stand next to *P. sarmentosa.*

SECT. II. *Seeds* dorsally convex with 4 furrows.

* *Stem scandent.*

17. **P. sarmentosa,** *Blume Bijd.* 964; climbing, glabrous, leaves elliptic or elliptic-obovate acute or acuminate, nerves 6–8 pair, petiole slender, cymes terminal subsessile compressed corymbiform or brachiate, branches opposite, flowers pedicelled, fruit small obovoid 8-grooved, calyx-limb very small. *DC. Prodr.* iv. 522; *Wight Ic.* t. 1038; *Thw. Enum.* 148; *Kurz For. Fl.* ii. 14. P. scandens,

Moon. Cat. 14. P. obovata, *Wall. Cat.* 8380. Grumilea Junghuhniana, *Miq. Fl. Ind. Bat.* ii. 296. Psychotria Nov. Sp., *Miq. in Pl. Hohen. n.* 809. Psychotria Sp., *Wall. Cat.* 8382, ? 8381, ? 8384.

WESTERN PENINSULA, from Canara southwards. CEYLON, ascending to 4000 ft. EASTERN PENINSULA, from Tenasserim southwards to Singapore and Penang. DISTRIB. Malay Archipelago.

A twining shrub, 10 ft. and upwards; branches slender, smooth pale. *Leaves* $2\frac{1}{2}$-$3\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{2}$ in., greenish or yellowish when dry, thin or coriaceous, base far produced on the petiole, nerves faint, veins inconspicuous; stipules ovate, caducous. *Cymes* broad, 2–3 in. diam., rachis and branches angled; bracteoles caducous. *Flowers* very small, greenish. *Calyx-teeth* minute. *Corolla-tube* $\frac{1}{8}$ in., villous within. *Fruit* $\frac{1}{5}$ in., white, fleshy. *Seed* dorsally 4-grooved, ventrally concave; albumen equable.—Some of Wallich's 8381 and 8384 are no doubt young states (flowerless) of this, or possibly of *P. polycarpa.*

18. **P. Maingayi,** *Hook. f.*; climbing, shoots petioles and cymes hairy, leaves elliptic-lanceolate acuminate at both ends, nerves 8–10 pair, stipules persistent connate membranous toothed, cymes axillary small peduncled, fruit broadly ellipsoid 8-grooved, calyx-limb large, lobes broad recurved.

SINGAPORE, *Maingay.*

Branches slender, smooth. *Leaves* 2–3 by $\frac{1}{2}$–$1\frac{1}{4}$ in., rather thin, narrowed into the very short slender petiole; nerves faint; stipules pubescent. *Cymes* almost tomentose; peduncle slender, compressed; branches few, opposite; bracts linear, persistent. *Fruit* subsessile, $\frac{1}{5}$ in. long; calyx-limb cupular, pubescent. *Seed* as in *P. sarmentosa.*

19. **P. ovoidea,** *Wall. Cat.* 8383; climbing and rooting, branches leaves beneath and cymes villous, leaves petioled elliptic or ovate cuspidate, nerves 5–6 pair, cymes terminal small sessile or peduncled umbellately branched, flowers subcapitate, fruit small pedicelled ellipsoid 8-grooved, calyx-limb with erect acute teeth.

SINGAPORE, *Wallich*; MALACCA, *Maingay* (Kew Distrib. 923).—DISTRIB. Malay Archipelago?

Branches slender; pubescence spreading, dark, rufous when dry. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., brown especially beneath when dry, coriaceous, margin often recurved, base acute obtuse or subcordate, nerves strong beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules connate, caducous. *Cymes* with spreading stout compressed branches; peduncle 1 in. or less; bracteoles elongate, linear, very persistent, tomentose; flowers very small. *Corolla-tube* pubescent, villous within. *Fruit* $\frac{1}{8}$ in., pubescent; calyx-limb cupular. *Seed* as in the section.

20. **P. morindæflora,** *Wall. Cat.* 8438, A. B. C. *in part*; climbing, rooting, quite glabrous, leaves petioled elliptic obtusely acuminate shining, nerves 5–7 pair, cymes terminal subsessile and pedicelled small, flowers capitate at the end of the short branches, fruit small ellipsoid 8-grooved, calyx-limb small. ? Psychotria, *Wall. Cat.* 8355.

PENANG and SINGAPORE, *Wallich, Porter.*

Branches smooth, slender, dark brown when dry. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., coriaceous, usually red-brown when dry, base acute, nerves slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules connate, caducous. *Cymes* with few short or long spreading compressed naked branches bearing globose heads $\frac{1}{4}$ in. diam. of small flowers; bracts and bracteoles linear, caducous. *Calyx-limb* truncate, obscurely toothed. *Corolla-tube* glabrous, mouth villous. *Fruit* $\frac{1}{5}$ in. long, sessile or peduncled. *Seed* as in the section.—Amongst Wallich's specimens are some with sessile and others with pedicelled fruit; it is possible that these may belong to different species. His No. 8355 from Singapore has narrow oblong-lanceolate leaves, very long (4–5 in.) peduncles, bearing a puberulous umbel of 6–10 rays, each ray bearing a head of sessile flowers $\frac{1}{4}$ in. diam.

** *Erect shrubs.*

21. **P. Wightiana,** *Thw. Enum.* 148 (Grumilea); branches leaves beneath and cymes villous with rufous hairs, leaves elliptic-lanceolate finely acuminate, nerves 8–10 pair, cymes terminal cruciately brachiate, branches few naked with terminal globose heads of sessile flowers or cymes reduced to a solitary long peduncled or sessile globose head. Lasianthus? dubius, *Wight in Calc. Journ. Nat. Hist.* vi. 516.

CEYLON; Ambagamowa and Saffragan districts, on banks of streams, *Walker*, &c.
A small shrub, branches stout. *Leaves* 5–7 by 2–3½ in., rather coriaceous, brownish green when dry, smooth and opaque above, nerves strong beneath; petiole ½–¾ in.; stipules oblong, connate, villous. *Cymes* densely villous, sessile or peduncled; branches and peduncle stout, the latter sometimes deflexed; bracteoles minute, obtuse; heads of sessile flowers dense, villous, ¼–½ in. diam. *Calyx* very short, cupular, limb truncate, teeth triangular. *Corolla-tube* very short, pubescent; throat hairy. *Fruit* "subspherical, hairy, ¼–⅓ in. diam., subcarinate," *Thwaites.*
VAR.? *affinis*; leaves sparsely hairy narrowly elliptic-lanceolate 4 by ½–¾ in. Grumilea affinis, *Thw. Enum.* 148.

22. **P. madraspatana,** *Hook. f.*; petioles leaves beneath and inflorescence rusty-tomentose, leaves large long-petioled elliptic or elliptic-obovate obtuse or subacute, nerves 20–30 pair, cymes reduced to a globose sessile head, fruit ellipsoid and grooved, calyx-limb very short. Psychotria, *Wall. Cat.* 8366.

"HERB. MADRAS," *Wallich.*
Branches very stout, woody, covered with brown shining bark, tips pubescent with spreading hairs. *Leaves* 6–12 by 2½–4 in., thinly coriaceous beneath, finely pubescent between the rufous-tomentose numerous slender nerves; base narrowed into a 1½ in. petiole; stipules connate, villous, membranous. *Head* 1 in. diam., terminating the stout branch, and in one specimen covering the bases of the pair of petioles, densely rufous-pubescent; bracts and bracteoles numerous, as long as the flowers, linear or oblong, membranous, villous, persistent, outer broader. *Calyx-tube* shorter than the 5 unequal lanceolate villous lobes. *Corolla* not seen. *Fruit* ⅙ in. long, villous, crowned by the lanceolate calyx-lobes. *Seed* with very deep dorsal and 2 narrow ventral grooves.—In habit and appearance this resembles *P. Wightiana* and *Helferiana*, but differs entirely from both; I have seen no specimen but that in Wallich's Herbarium.

23. **P. stipulacea,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 164; *Cat.* 8329; very robust, glabrous, leaves very long oblanceolate or obovate-oblong acuminate narrowed into the very stout winged petiole, nerves about 20 pair, cymes trichotomous, peduncle and branches very stout, flowers pedicelled, fruit ellipsoid deeply 4-grooved. *DC. Prodr.* iv. 519.

PENANG, *Jack, Phillips, Wallich.*
Branches as thick as the middle finger, soft, compressed, and foliage reddish brown when dry. *Leaves* 8–14 by 3–5 in., not coriaceous, nerves slender; petiole 1–1½ in.; stipules ½–¾ in. long, broadly ovate, acute, often 2-fid. *Cymes* 2–3 in. diam., broader than long; peduncle and branches very stout; bracts and bracteoles triangular, upper persistent; flowers very small. *Calyx-teeth* short, triangular. *Corolla-tube* $\frac{1}{10}$ in., glabrous, villous within. *Fruit* ¼ in. long, grooves deep; calyx-limb small. *Seed* ventrally concave.

24. **P. Jackii,** *Hook. f.*; glabrous, leaves petioled elliptic or obovate-lanceolate obtusely acuminate, nerves 10–12 pair, cymes shortly peduncled brachiate, branches slender, fruit pedicelled 8-grooved. Psychotria, *Wall. Cat.* 8343.

PENANG, *Jack, Wallich*; MALACCA, *Griffith* (Kew Distrib. 3021).
Branches slender, polished, nodes with broad stipular scars. *Leaves* 5–7 by 1¼–2½

in., rather thin, red-brown when dry and shining above, midrib and nerves slender; base narrowed into the slender petiole; stipules oblong-ovate, deciduous. *Cymes* 3–4 in broad; branches angled, sometimes obscurely puberulous, divaricate, much 3-chotomously divided; flowers pedicelled, minute. *Calyx* truncate, teeth obscure. *Corolla-tube* very short, glabrous, villous within. *Fruit* $\frac{1}{6}$–$\frac{1}{5}$ in. long, areolate, calyx-teeth very obscure. *Seeds* of the section, ventral face plane.—A near ally of the Chinese *P. elliptica*, Ker in Bot. Reg. t. 607 (P. Reevesii, *Wall. Cat.* 8330, and in *Roxb. Fl. Ind.* ii. 164), but more slender, leaves less coriaceous, with slender midrib and nerves, and smaller flowers.

25. **P. divergens,** *Kurz For. Fl.* ii. 13; *and in Journ. As. Soc.* 1877, ii. 143, *not of Blume*; glabrous, leaves lanceolate to linear-lanceolate acuminate tapering into a long petiole, cymes long-peduncled trichotomous, flowers shortly pedicelled, calyx-teeth obsolete, fruit ovoid 5-ribbed and furrowed crowned by the calyx-limb.

PEGU, MALABAR, and TENASSERIM, in tropical forests, *Kurz.*

An evergreen shrub, 1$\frac{1}{2}$–2 ft. *Leaves* 5–8 in., firmly membranous or thinly coriaceous, usually brownish when dry; petiole $\frac{1}{2}$–1 in.; stipules variable, often very large and elongate, entire or 2-cleft. *Flowers* greenish. *Corolla* $\frac{1}{12}$–$\frac{1}{6}$ in., lobes as long, throat villous. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ in. long, smooth. *Albumen* equable, spuriously ruminate, or rather 5-ribbed.—I have seen no authentic specimen, and take the description from Kurz, who says that it differs from *P. andamanica* only in the glabrous cymes. It cannot be Blume's *P. divergens*, which has a prominently toothed calyx and very large flowers; it is probably a glabrous form of *P. sulcata*.

26. **P. andamanica,** *Kurz in Lond. Journ. Bot.* 1875, 328; *For. Fl.* ii. 13; glabrous except the cymes, leaves long-petioled elliptic-obovate or -lanceolate caudate-acuminate, nerves 8–10 pair remote, cymes subsessile much trichotomously branched, fruit ellipsoid 8-grooved.

ANDAMAN and NICOBAR ISLANDS, *Kurz.*

A small evergreen shrub; branches stout, pale, the wood shrinking in drying. *Leaves* 6–9 by 2$\frac{1}{2}$–3$\frac{1}{2}$ in., membranous, greenish-brown when dry, often subfalcate; nerves slender, arched; base narrowed into the 1–2 in. long petiole; stipules large, oblong, 2-cleft, deciduous. *Cymes* glabrous or rusty-puberulous, 3 in. diam., branches divaricate; flowers shortly pedicelled, greenish-white. *Calyx* almost truncate; teeth short, broad. *Corolla* glabrous, tube $\frac{1}{12}$ in., much exserted, throat villous. *Fruit* $\frac{1}{4}$ in. long, smooth, calyx-limb persistent.—I have seen no fruit, nor any Andaman specimens; it is probably a broad-leaved form of the following.

27. **P. sulcata,** *Wall. Cat.* 8370; leaves long-petioled elliptic-lanceolate or oblanceolate acuminate membranous puberulous or glabrate beneath, nerves 10–15 pair, stipules very large lax, cymes axillary or terminal sessile or peduncled repeatedly trichotomously divided, fruit pedicelled broadly ellipsoid 8-grooved, calyx very small.

TENASSERIM, MALABAR, and BIRMA, *Wallich, Helfer,* &c.

Branches rather slender, smooth. *Leaves* 3–9 by 2–2$\frac{1}{2}$ in., greenish or brown when dry, nerves slender, base narrowed into a petiole $\frac{1}{2}$–1$\frac{1}{2}$ in. long; stipules $\frac{1}{2}$–$\frac{2}{3}$ in., straight or falcate, obtuse acute or acuminate, rather persistent for the genus. *Cymes* small, 1–2$\frac{1}{2}$ in. diam.; branches divaricate; bracts triangular; flowers very small, glabrous. *Calyx-limb* truncate. *Corolla-tube* glabrous, very short. *Fruit* $\frac{1}{6}$ in. long, grooves not deep. *Seed* flat on the ventral face.

28. **P. erratica,** *Hook. f.*; glabrous, leaves lanceolate or elliptic acuminate, petiole slender, nerves 9–12 pair, stipules usually cleft, cymes axillary and terminal sessile glabrous or puberulous rather shortly trichotomously branched, fruit pedicelled 8-grooved, calyx-limb small.

NIPAL and SIKKIM HIMALAYA, alt. 4–6000 ft., *J. D. H.*, &c.: BHOTAN, alt. 5000 ft., *C. B. Clarke*; KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c.

Shrubby. *Leaves* 5–7 by 1–2½ in., green when dry, rather thin, base narrowed into a petiole ¼–¾ in., nerves slender; stipules with often 2 recurved acute lobes. *Cymes* 1 in. diam., often inclined; branches flattened, soon dividing; bracts elongate, slender. *Calyx* minute; teeth broad or narrow, subacute, sometimes glandular. *Corolla-tube* very short, hairy within. *Fruit* ⅙–⅓ in., red and yellowish, grooves shallow. *Seed* undulated on the ventral face.—This is one of the very few species that wanders westward as far as the valley of Nipal.

VAR. *latifolia*; leaves broadly elliptic.—Khasia Mts., *De Silva.*—Psychotria sp., *Wall. Cat.* 8340.

VAR. *pedunculata*; cymes axillary, peduncle 1–2 in.—Nipal, *Wallich.*—Psychotria, *Wall. Cat.* 8369.

29. **P. fulva,** *Ham. in Wall. Cat.* 8336, *excl.* B.; glabrous or pubescent, branches stout, leaves petioled elliptic oblong obovate or lanceolate, stipules large cleft, cymes axillary and terminal peduncled or sessile, branches trichotomous or whorled, flowers usually in dense globose heads, bracts broad often whorled persistent, fruit large ellipsoid 8-grooved, calyx-limb persistent. P. monticola, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 11. Psychotria, *Wall. Cat.* 8337; *Griff. Notul.* iv. 268; *Ic. Pl. Asiat.* t. 479, f. 2.

ASSAM and the KHASIA MTS., ascending to 4000 ft.; CACHAR, MUNNIPORE, and PEGU.

A large shrub. *Leaves* a foot long and under, very variable in breadth, usually narrowed into the petiole, rarely rounded at the base, variously coloured when dry, often purplish-brown or reddish, thinly coriaceous; nerves slender, spreading, sometimes pubescent beneath; petiole ⅓–1 in.; stipules ½–1 in., axils villous, segments sometimes hooked and recurved. *Cymes* large or small, rarely 2 in. across; peduncle 4 in. or less, pubescent or villous; branches stout, short or long; bracts and bracteoles excessively variable, more or less persistent; flowers subsessile, glabrous or pubescent. *Calyx* minute; teeth 5, short or long. *Corolla-tube* short, glabrous, villous within. *Fruit* capitate, ¼–½ in. long, variable in shape, ellipsoid or ovoid, sometimes narrowed towards the top; grooves very shallow. *Seed* flat ventrally, with or without a 2-fid groove.—A very variable plant, covered with yellowish flowers in May, whence its name, which, never having been published, would be superseded by Kurz's of *P. monticola*, were not the plant to which he gave that name an aberrant form, which is moreover erroneously described as glabrous in the Forest Flora; under which circumstances, and considering that the name *monticola* has been since applied to a tropical African species, it is advisable to retain Hamilton's appropriate one of *fulva* for this species.

VAR. *monticola*; leaves more coriaceous, nerves distant pubescent beneath. P. monticola, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 11.—Karen hills, *Kurz.*

30. **P. tortilis,** *Blume Bijd.* 958; subherbaceous, stem simple, leaves long-petioled broadly elliptic-ovate acute membranous puberulous beneath, base cuneate rarely cordate, nerves 15–20 pair, veins reticulate, cymes all axillary small subsessile rounded, fruit very small didymous compressed, grooves 8 very shallow. *DC. Prodr.* iv. 520. P. microcarpa, *Wall. Cat.* 8344. Streblosa tortilis, *Korth. in Ned. Kruidk. Arch.* ii. 246.

PENANG, *Wallich*; SINGAPORE, *Lobb.*—DISTRIB. Java, Sumatra.

Stem 1 foot from a woody base, sparsely pubescent. *Leaves* 4–7 by 2–4½ in., green when dry, very membranous; nerves spreading, slender; petiole very slender, 1–2 in.; stipules ovate, acute, or broader with a long cusp. *Cymes* often from all the axils, pubescent, contracted and dense-flowered but not capitate; pedicels rarely 1–2 in.; bracts very small; flowers minute. *Calyx-teeth* very minute, triangular. *Corolla-tube* very short, hairy within. *Fruit* $\frac{1}{14}$–$\frac{1}{12}$ in. diam., broader than long, pale. *Seed* flat on the ventral face.—A very peculiar species, quite unlike any other in habit and fruit.

SECT. III. *Seeds* with one obtuse dorsal ridge and 2 dorsal broad shallow furrows.

* *Cymes capitate.*

31. **P. Moonii,** *Thw. Enum.* 148 (Grumilea); glabrous, leaves elliptic or elliptic-lanceolate acuminate narrowed into the stout petiole, flowers in dense peduncled heads mixed with large villous-edged bracts, fruit narrowly ovoid.

CEYLON; Reigam Corle, at no great elevation, *Walker, Thwaites.*

Branches stout, ultimate compressed. *Leaves* 5–7 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., greenish or reddish when dry; nerves 12–14 pair, stout, much arched; stipules oblong, connate, ciliate. *Cymes* of 3–5 terminal stout branches 1 in. long, each bearing a subglobose head $\frac{1}{2}$–$\frac{3}{4}$ in. diam., the main peduncle suppressed, the lateral deflexed, the central simple or 3-chotomous; bracteoles large, rounded, coriaceous, persistent, hairs rufous; flowers sessile. *Calyx-limb* tubular, 5-toothed, ciliate. *Fruit* $\frac{1}{3}$ in., crowned with the cupular calyx-limb, nearly circular in section with 4 broad shallow furrows. *Seeds* plano-convex; albumen equable.

32. **P. sordida,** *Thw. Enum.* 149; glabrous, leaves petioled lanceolate or oblong-lanceolate caudate-acuminate, nerves very faint, stipules ovate, flowers 3–4-nate in small peduncled deflexed heads, fruit oblong, calyx-limb obsolete.

CEYLON; central province, alt. 4–8000 ft., *Walker, Thwaites.*

Branches slender, ultimate-compressed. *Leaves* 3–5 by $\frac{3}{4}$–$1\frac{1}{4}$ in., pale or dark brown when dry, coriaceous; nerves 6–8 pair, sometimes hardly visible; petiole $\frac{1}{4}$ in.; stipules acute. *Cymes* of 3–5 short stout branches $\frac{1}{4}$–$\frac{3}{4}$ in. long, the main peduncle short or 0; bracteoles minute, caducous; flowers minute, sessile. *Calyx* with a funnel-shaped 5-toothed limb. *Corolla-tube* short, broad, glabrous within and without. *Fruit* $\frac{1}{4}$ in.; pyrenes with broad shallow dorsal furrows.

** *Cymes not capitate.*

33. **P. longipetiolata,** *Thw. Enum.* 149; glabrous, leaves long-petioled elliptic-oblong or ovate-oblong acuminate base rounded or cordate, cymes terminal peduncled, lower branches whorled trichotomous few-flowered, fruit ovoid crowned with the minute calyx-teeth.

CEYLON; Saffragan district, alt. 3–4000 ft., *Thwaites.*

Leaves 5–6 by $1\frac{1}{4}$–2 in., yellowish when dry, midrib stout; nerves 6–10 pair, very spreading; petiole 1–$1\frac{3}{4}$ in., slender; stipules oblong, acute. *Cymes* small, about $1\frac{1}{2}$ in. broad, nearly glabrous; bracts minute, caducous; flowers very small. *Calyx-tube* obconic; teeth triangular. *Corolla-tube* very short. *Fruit* $\frac{1}{3}$ in.; pyrenes dorsally compressed, with very broad shallow lateral furrows.—The specimens are not copious.

34. **P. plurivenia,** *Thw. Enum.* 147; glabrous, leaves narrowly oblanceolate acute narrowed into a very short petiole, marginal nerves very numerous slender horizontal, fruit fusiform.

CEYLON; Hewahette, in the central province, alt. 3–4000 ft., *Thwaites.*

Branches slender. *Leaves* 3–4 by $\frac{3}{4}$–1 in., dark green and wrinkled when dry, margin thickened and often yellowish; nerves 30–40 pair, slender and undulating, hardly distinguishable from the veins; stipules lanceolate, $\frac{1}{4}$ in. *Cymes* very sparingly branched, glabrous, trichotomous; bracteoles minute; flowers ternate, shortly pedicelled. *Calyx-teeth* lanceolate, exceeding the very short corolla-tube, which is hairy within. *Seed* "furrowed," *Thwaites.*—I have seen a single specimen without fruit.

35. **P. filipes,** *Hook. f.*; glabrous, leaves oblanceolate acuminate narrowed into a very short petiole, nerves numerous, stipules broad, cymes terminal irregularly branched peduncles and pedicels very slender, fruit oblong or subfusiform truncate. ? P. bisulcata, var. β., *Thw. Enum.* 148.

CEYLON; Hantani, alt. 3000 ft., *Gardner.*

Branches pale. *Leaves* 5–7 by 1–$1\frac{3}{4}$ in., yellowish-green when dry; nerves 15–20

pair, obliquely arched, slender; petiole short; stipules terminal ovate-oblong, obtuse or 2-fid, lower broader sometimes rounded. *Cymes* subsessile; branches spreading in fruit, 2–3-chotomously divided; flowers not seen. *Fruit* $\frac{1}{3}$ in., deeply grooved, pyrenes ventrally flat, dorsally with a very prominent broad rounded rib, and two broad deep furrows.—I have seen no specimen of Thwaites' *P. bisulcata*, var. *β.*, the character of which applies to this, and which he suggests being a distinct species.

36. **P. bisulcata,** *W. & A. Prodr.* 434; glabrous, leaves obovate or elliptic-obovate or subcuneate narrowed into the petiole obtuse acute or acuminate, nerves 6–10 pair, cymes peduncled subebracteolate trichotomous, flowers sessile, fruit ovoid or ellipsoid crowned with the small calyx-teeth. *Wt. Ic.* t. 1039. P. Dodda-Jervam, *Schlecht. Pl. Hohenack. n.* 1372, Rubiacea, *Wall. Cat.* 8458.

NILGHERRY MTS., *Wight*, &c. CEYLON, alt. 5–7000 ft., *Walker*, &c.

Branches rather stout. *Leaves* 2–5 by 1–2 in., rarely lanceolate, usually pale green with often a yellow midrib, coriaceous, base always cuneate; petiole $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules $\frac{1}{4}$ in., ovate, acute. *Cymes* stoutly peduncled, rarely sessile, erect; branches opposite, short or long, suberect; bracteoles minute, caducous; flowers very small, sessile. *Calyx-teeth* small, triangular. *Corolla-tube* short, villous within. *Fruit* $\frac{1}{3}$ in.; pyrenes with a broad rounded dorsal ridge and two shallow broad lateral furrows. *Seed* flat ventrally.

37. **P. connata,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 163; glabrous, leaves subsessile elliptic or oblanceolate obtuse or obtusely acuminate coriaceous shining above, cymes terminal peduncled, branches whorled, bracts coriaceous connate persistent, fruit ellipsoid crowned with the calyx-limb. *Wall. Cat.* 8347; *DC. Prodr.* iv. 519; *W. & A. Prodr.* 433. P. lævigata, *W. & A. Prodr. l. c.*; *Wt. Ic.* t. 828.

TRAVANCORE; at Courtallam, *Heyne, Wight.*

Branches smooth, pale. *Leaves* 4–7 by 1–1$\frac{3}{4}$ in., narrowed into a very short stout petiole, reddish brown when dry, nerves 8–12 pair; stipules ovate or lanceolate, simple or 2-fid. *Cymes* erect; peduncle 2 in. and under, and branches stout; bracts coriaceous, broad, ovate, whorled and connate, $\frac{1}{6}$ in. long; bracteoles ovate, acute, ciliolate; flowers sub-3-nate, sessile. *Calyx* urceolate, 5-toothed. *Corolla* funnel-shaped, lobes lanceolate, throat woolly. *Fruit* $\frac{1}{3}$ in.; pyrenes with a broad rounded dorsal ridge and two shallow broad furrows. *Seed* ventrally flat.

38. **P. anamallayana,** *Bedd. Ic. Pl. Ind. Or.* t. 236; glabrous, leaves large very long-petioled oblanceolate acute or abruptly acuminate, nerves 8–12 pair, cymes terminal peduncled, branches stout whorled, bracts small caducous, fruit ovoid, calyx-limb small. Grumilea longifolia, *Bedd. in Trans. Linn. Soc.* xxv. 218.

TRAVANCORE; Anamallay hills, *Beddome.*

Branches stout, soft. *Leaves* 8–10 by 1$\frac{1}{2}$–3 in.; gradually narrowed at the base into a petiole 1$\frac{1}{2}$–3 in., greenish when dry, rather membranous; nerves spreading, slender; stipules 1 in., ovate or oblong-lanceolate, acuminate. *Cymes* 2–3 in. long and broad; peduncle very stout; bracts and bracteoles very inconspicuous; flowers shortly pedicelled. *Calyx* broadly obconic; limb broad, truncate. *Corolla-tube* broad, with a ring of hairs within. *Fruit* $\frac{1}{2}$ in., immature, but apparently as in *P. connata.*

39. **P. Griffithii,** *Hook. f.*; glabrous or the cymes puberulous, leaves large petioled linear-oblong or elliptic-lanceolate or sublanceolate acuminate coriaceous, nerves strong 15–20 pair, cymes terminal peduncled short dense-flowered, branches short stout irregular, bracts small caducous, fruit large ellipsoid truncate deeply furrowed.

MALACCA, *Griffith* (Kew Distrib. 3044), *Maingay.*

Branches stout, woody. *Leaves* 5–12 by 1$\frac{1}{2}$–3$\frac{1}{2}$ in., very pale and shining when

dry; midrib stout; nerves stout on both surfaces, obliquely arching; petiole ½–1 in.; stipules ¼–½ in., "fleshy" (Griffith), ovate-cordate or -lanceolate, entire or 2-fid. *Cymes* short; peduncle 2 in. or less; branches usually whorled, sometimes irregularly alternate, very short and stout; flowers subsessile. *Calyx* obconic, limb broad; teeth 5, triangular. *Corolla-tube* broad, mouth villous. *Fruit* ½ in. long and upwards, shining; dorsal ridge of pyrenes very strong and furrows broad and deep. *Seed* flat ventrally.

40. **P. angulata,** *Korth. in Ned. Kruidk. Arch.* ii. 243; glabrous, leaves obovate cuneate-obovate or oblanceolate rarely elliptic acute or abruptly acuminate coriaceous narrowed into the short or long petiole, cymes terminal peduncled, branches stout whorled, bracts persistent, flowers subcapitate, fruit shortly ellipsoid truncate, calyx-limb persistent. *Miq. in Ann. Mus. Lugd. Bat.* iv. 210. Psychotria, *Wall. Cat.* 8348. Chasalia perforata, *Miq. Fl. Ind. Bat. Suppl.* 546.

TENASSERIM; Mergui, *Griffith, Helfer.* MALACCA, *Griffith.* SINGAPORE, *Wallich.* PENANG, *Porter.*—DISTRIB. Banca, Java, Borneo.

Branches rather rough. *Leaves* 4–8 by 2–2½ in., rather shining, pale greenish when dry, or dark; nerves slender, arching; petiole ⅓–⅝ in.; stipules, upper ovate connate, lower rounded and cuspidate. *Cymes* very variable; peduncle 3 in. and less, stout, branches very stout; bracts broadly ovate, coriaceous; bracteoles small or 0; flowers sessile. *Calyx-limb* truncate. *Corolla-tube* very short, throat woolly. *Fruit* ¼ in., dorsal ridge of pyrenes rounded. *Seed* flat ventrally.

41. **P. symplocifolia,** *Kurz For. Fl.* ii. 11; glabrous, leaves small obovate or elliptic-obovate or -lanceolate caudate-acuminate narrowed into a short petiole, nerves 6–10 pair, stipules acuminate, cymes terminal peduncled, branches slender trichotomous, fruit ellipsoid, calyx-limb minute. Psychotria, *Wall. Cat.* 8357; *Herb. Ind. Or. H. f. & T.* n. 27. Morinda? *Wall. Cat.* 8428.

KHASIA MTS., alt. 3–6000 ft., abundant, *De Silva*, &c.; MARTABAN HILLS, alt. 5–7000 ft., *Kurz.*

A shrub or small tree, branches slender. *Leaves* 3–5 by 1–1½ in., green when dry with pale midrib nerves and sometimes margins; petiole ¼–⅓ in.; stipules ¼ in. and less, ovate, acute or with subulate points. *Cymes* very variable, rarely sessile; branches opposite, usually long, spreading, slender and trichotomously divided at the top with short divisions; bracts, bracteoles, and flowers very small. *Calyx-teeth* triangular. *Corolla-tube* short, throat villous. *Fruit* ¼ in., sometimes truncate, not deeply ridged and furrowed. *Seed* flat ventrally. - This is the Eastern representative of the Western *P. bisulcata.* Kurz's Martaban specimens have much shorter and stouter cyme-branches than the Khasian.

42. **P. Helferiana,** *Kurz in Journ. As. Soc.* 1872, ii. 314; *For. Fl.* ii. 11; hirsute, leaves large broadly elliptic or lanceolate acuminate base narrowed into a long or short petiole, flowers in dense heads, mixed with hirsute persistent bracteoles in axillary or terminal peduncled or subsessile cymes, fruit ovoid crowned by the dilated calyx-limb. Psychotria, *Wall. Cat.* 8368.

EASTERN PENINSULA; from Pegu, *M'Clelland*, to Tenasserim, the Andaman Islands, Singapore, and Penang, *Wallich*, &c.

An erect shrub; branches stout. *Leaves* very variable, 5–10 by 2–5 in., red-brown when dry, rather membranous; nerves 12–15 pair, oblique or very spreading; petiole ½–2 in.; stipules 1 in., lanceolate, acuminate, 2-cleft, hirsute. *Cymes* very variable; heads of flowers 1–1½ in. diam.; peduncle very stout; bracts large, deciduous, and numerous small bracteoles hirsute. *Calyx* minute, teeth lanceolate. *Corolla-tube* short, glabrous, throat villous. *Fruit* hirsute or glabrate; pyrenes with a broad dorsal ridge and 2 lateral shallow furrows. *Seed* flat ventrally.

43. **P. nicobarica,** *Kurz in Lond. Journ. Bot.* 1875, 328; shoots petioles and nerves beneath pubescent or glabrate, leaves large broadly elliptic acute,

petiole stout, nerves 12–14 pair, stipules large rufous, cymes subsessile, flowers crowded, bracts and bracteoles minute, fruit broadly ellipsoid, calyx-limb minute.

NICOBAR ISLANDS; coral-reef forests on the east coast of Katchall, *Kurz.*

Stem subsessile, 1–2 ft., very stout, rusty-pubescent. *Leaves* 6–10 by 2–4 in., rather succulent, base acute, brown when dry; petiole very stout, $\frac{1}{2}$–1 in.; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., broadly ovate, 2-fid. *Cymes* puberulous; branches very short in a flowering specimen, long and spreading in fruiting ones; flowers pedicelled, very small. *Calyx-teeth* ovate, acute. *Corolla-tube* ovoid, throat villous; lobes acute, reflexed. *Fruit* $\frac{1}{4}$ in. long, glabrous, pyrenes acutely ribbed.—I have very imperfect materials, and depend on Kurz's character. This describes the albumen as spuriously ruminate, alluding, no doubt, to the furrows.

SECT. IV. *Seeds* dorsally convex and rounded, not or slightly ridged or grooved.

44. **P. calocarpa,** *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 9; subherbaceous, young parts and leaves beneath puberulous with crisped hairs finally glabrate, leaves long- or short-petioled lanceolate or elliptic-lanceolate acuminate often variegated margins entire or broadly crenate, intra-marginal nerve conspicuous, stipules large ovate often 2-fid, cymes small axillary and terminal shortly peduncled, calyx-teeth slender, fruit ellipsoid or subglobose crowned with the calyx-teeth. P. asiatica, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 160; *Cat.* 8331; *not of Linn. or of Roxb.* P. viridiflora, *Reinw. var.* 2, *Kurz For. Fl.* ii. 13. P. picta, *Wall. Cat.* 8353; and Psychotria, 8359. Psychotria, 24, 25, 26, *Herb. Ind. Or. H. f. & T.*

NIPAL, *Wallich.* SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.* UPPER ASSAM; Suddya, *Griffith.* KHASIA MTS., ascending to 4000 ft., *De Silva,* &c. CACHAR, *Keenan.* CHITTAGONG, MARTABAN, and TENASSERIM, *Gomez,* &c.

A small evergreen subherbaceous bush, 1–3 ft. high, with often a creeping stem sending up erect soft branches. *Leaves* very variable in size and shape, 4–8 by 1–3 in., dark or pale green when dry, narrowed into a petiole $\frac{1}{2}$–2 in. long, shining or opaque above, thinly coriaceous or membranous, nerves sometimes margined with white; margin often crenate, the crenatures following the loops of the intramarginal nerve; stipules usually ovate or orbicular, and 2-cuspidate, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Cymes* often secund and drooping, with spreading or reflexed fruiting branches, glabrous or pubescent, lax or dense-flowered; bracts lanceolate, caducous or subpersistent; flowers subsessile, pink greenish or white. *Calyx-teeth* linear, ciliate. *Corolla tube* very short, throat villous. *Fruit* $\frac{1}{3}$ in. long, succulent, orange or red; pyrenes dorsally obscurely 4-ribbed. *Seed* with or without a ⊤-shaped ventral groove.—*P. viridifolia,* Reinwdt., referred here by Kurz, is a *Grumilea.* I have not seen his specimens, of which he makes 2 varieties: one with entire leaves and inconspicuous calyx-teeth, the other (from Chittagong) with waved leaves and larger calyx-teeth.

45. **P. Thomsoni,** *Hook. f.*; cymes pubescent, leaves petioled lanceolate caudate-acuminate, intra-marginal nerve conspicuous, stipules large 2-cuspidate, cymes terminal long-peduncled trichotomous, calyx-teeth triangular. Psychotria, No. 25, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., *Griffith* (Kew Distrib. 3027); Churra, alt. 4000 ft., *J. D. H. & T. T.*

Very similar to *P. calocarpa* in foliage, but quite different in the elongate cyme, which is stout erect and with the peduncle 3–4 in. long, and the very short broad calyx-teeth. The stipules are $\frac{1}{2}$–$\frac{3}{4}$ in. long, orbicular, with two long cusps, and the bracteoles are subulate.

46. **P. denticulata,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 166; *Cat.* 8326; glabrous or leaf-nerves beneath and cymes puberulous, leaves petioled large broadly elliptic or obovate or oblanceolate acute or abruptly acuminate,

nerves 15–20 pair, cymes terminal and axillary long-peduncled corymbiform ebracteolate, fruit small subglobose smooth. *DC. Prodr.* iv. 520. S. polyneura, *DC. l. c.* P.? Chloranthus, *Herb. Ham. in Wall. Cat.* 8336 B. Psychotria, *Wall. Cat.* 8372.

Central and Eastern Tropical Himalaya; NIPAL, *Wallich*; SIKKIM, alt. 6000 ft., *J. D. H.*; BHOTAN and ASSAM, *Jenkins, Griffith* (Kew Distrib. 3024); and KHASIA MTS., alt. 2000 ft., *J. D. H. & T. T.* MARTABAN, *Wallich.*

Branches robust. *Leaves* very variable, 6–7 by 2–2½ in. in the oblanceolate forms, 8–10 by 4–6 in. in the broader forms, pale green or dark when dry, base acute or rounded; nerves strong, close-set, subhorizontal or ascending, not arched; petiole ¼–⅔ in.; stipules ¾ in., ovate, lax, entire or 2–3-cleft. *Cymes* 2–3 in. diam.; peduncle stout, 4 in. or less; branches whorled or opposite, together forming a flat-topped corymb; bracts and bracteoles minute, caducous; flowers minute, subsessile. *Calyx* hemispheric; limb truncate, obscurely toothed. *Corolla-tube* very short, throat villous. *Fruit* ⅕ in. diam.; pyrenes semi-circular in section, quite smooth. *Seed* ventrally flat with a forked median groove.

47. **P. silhetensis,** *Hook. f.*; cymes and leaves beneath pubescent or glabrate, leaves large stoutly petioled oblong or elliptic acuminate coriaceous, nerves 15–20 pair strong, cymes terminal and axillary long-peduncled corymbiform ebracteolate, fruit large pedicelled ovoid globose or ellipsoid smooth. P. fulva, *Wall. Cat.* 8336 C. Psychotria sp. 23, *Herb. Ind. Or. H. f. & T.*

UPPER ASSAM, *Griffith*; SILHET, CACHAR, and the KHASIA MTS., ascending to 4000 ft., *De Silva*, &c.

Branches very stout. *Leaves* 6–14 by 3–5 in., pale when dry, coriaceous; nerves strong, arched; petiole ½–1¼ in.; stipules 1 in., broadly ovate, often cleft. *Cymes* 2–4 in. diam., pubescent or puberulous; peduncle 3 in. and less, very stout; branches usually whorled, very stout, forming a corymb, spreading or deflexed in fruit; bracts and bracteoles minute, caducous; flowers small, pedicelled. *Calyx* obconic; limb almost truncate. *Corolla-tube* very short, throat with an exserted brush of erect hairs. *Fruit* ⅓–½ in., base rounded, smooth; pyrenes semicircular in section, quite smooth. *Seed* ventrally flat.—My own Khasian specimens have large ovoid fruits with no trace of a ventral groove in the seed and corymbiform cymes. Cachar ones from Keenan have a more irregular cyme, with smaller broader fruits and a deep T-shaped ventral groove, which, however, sometimes quite disappears. This species very closely resembles *P. fulva*, differing in the ebracteolate flowers and in the fruit.

48. **P. montana,** *Blume Bijd.* 960; glabrous, leaves on long slender petioles elliptic oblong or lanceolate acuminate very membranous, nerves 8–10 pair distant slender, cymes terminal and axillary sessile or peduncled, subcorymbiform branches slender, bracteoles minute, corolla-tube elongate, berry subglobose or obovoid, calyx-limb minute. *DC. Prodr.* iv. 521. P. viridissima, *Kurz in Journ. As. Soc.* 1872, ii. 315; *For. Fl.* ii. 13. Chasalia montana, *Miq. Fl. Ind. Bat.* ii. 281. C. expansa, *var.* montana, *Miq. in Herb.* Psychotria, *Wall. Cat.* 8371, 8378; and Rubiacea, 8339.

ASSAM PLAINS from Gualpara to Suddya, *Hamilton, Griffith*; SILHET, *De Silva*; TENASSERIM and ATTRAN, *Wallich, Helfer*, &c.—DISTRIB. Java.

A small subherbaceous species; branches slender, soft. *Leaves* 3–7 by 1–3 in., usually pale green when dry; nerves slender, arched; petiole ½–1⅓ in.; stipules ¼ in., triangular, entire. *Cymes* usually peduncled with whorled branches 2–3 in. diam.; flowers dense or lax, pedicelled. *Calyx-limb* spreading, teeth triangular. *Corolla-tube* long for the genus, $\frac{1}{15}$–⅙ in., glabrous, throat with a brush of hairs. *Fruit* ⅕–¼ in., pedicelled, red, rugose, ridged at the commissure. *Seed* thin, plano-convex, flat ventrally, without a groove.—Habit entirely of a *Chasalia*, but the corolla-tube is very short and the seed not concave ventrally.

VAR. ? *tabacifolia*; leaves 12–14 by 4–4½ in. oblong, nerves about 15 pair. P. (Coffea ?) tabacifolia, *Wall. Cat.* 8334.—Singapore, *Wallich.*

SPECIES OF WHICH THE FRUIT IS UNKNOWN.

49. **P. polyneura,** *Kurz in Lond. Journ. Bot.* 1875, 327; *For. Fl.* ii. 11, *not of DC.*; all parts except the leaves above ferruginous-pubescent or -tomentose, leaves very large long-petioled broadly or narrowly elliptic acute at both ends, nerves 30 pair close-set and spreading, stipules very large, cymes terminal small subsessile trichotomous ebracteolate, flowers sessile crowded.

SOUTH ANDAMAN ISLAND, *Kurz.*

Branches stout. *Leaves* 7–12 by $3\frac{1}{2}$–$5\frac{1}{2}$ in., membranous, red-brown when dry, nerves slender; petiole 2–$2\frac{1}{2}$ in.; stipules $\frac{3}{4}$ in. broadly ovate, connate, entire or cleft at the top. *Cymes* densely tomentose, 2–3 in. diam., branches spreading; flowers small. *Calyx* minutely 5-toothed. *Corolla-tube* very short.—Habit a good deal of *P. Helferiana*, but less hirsute, with fewer nerves, and wanting the bracteoles.

50. **P. penangensis,** *Hook. f.*; scandent, glabrous, leaves rhombic-elliptic or -obovate abruptly acuminate narrowed into the petiole, nerves very obscure, cymes terminal long-peduncled, branches umbellate, flowers pedicelled umbellate, bracts and bracteoles persistent.

PENANG; top of Government Hill, *Maingay.*

Dark brown or blackish when dry, apparently rather fleshy when fresh. *Leaves* 4–5 by $1\frac{3}{4}$–$2\frac{1}{2}$ in., thin when dry, nerves 6–8 pair, very spreading and arched; petiole $\frac{1}{2}$–1 in.; stipules rounded, connate, persistent. *Cymes* with a very stout erect peduncle 2–3 in.; primary branches about 5, stout, $\frac{3}{4}$–$1\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., subulate; umbellules $\frac{1}{2}$ in. diam., very many-flowered; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., bracteoles subulate. *Calyx-tube* obconic; teeth triangular, glabrous or puberulous. *Corolla-tube* broad, much longer than the calyx, hoary; throat hirsute. *Fruit* (unripe) stoutly pedicelled, $\frac{1}{3}$–$\frac{1}{2}$ in. long, narrowly ellipsoid, furrowed, crowned by the calyx-teeth.

51. **P. Johnsoni,** *Hook. f.*; glabrous, leaves obovate or elliptic-obovate or oblanceolate acute or abruptly acuminate tapering into a very short petiole, nerves 6–10 pair very slender, cymes terminal sessile or subsessile very small short ovoid or subglobose dense-flowered ebracteolate villous at the base, flowers sessile. Psychotria, *Wall. Cat.* 8352.

WESTERN PENINSULA; Cochin, *Wight* (Kew Distrib. 1442), *Johnson.*

Branches stout, smooth, terete, pale. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., pale when dry, rather coriaceous, nerves finely reticulate; stipules ovate, acute or rounded and cuspidate, coriaceous, glabrous. *Cymes* very rarely effuse and $1\frac{1}{2}$ in. diam.; peduncle 0 or short, arising out of long villous hairs; branches stout, short, opposite; flowers subternate, very small, glabrous. *Corolla* very shortly funnel-shaped, throat villous. —A very distinct species, of which I have seen no fruit.

52. **P. nudiflora,** *W. & A. Prodr.* 434; glabrous, leaves obovate cuneate-obovate or oblanceolate abruptly acuminate narrowed into the petiole, nerves 12–15 pair very slender, stipules connate ovate obtuse, cymes peduncled subcapitate or shortly panicled ebracteolate, calyx-limb truncate, corolla-tube elongate cylindric. Psychotria, *Wall. Cat.* 8346.

TRAVANCORE, *Heyne*; Courtallam, *Wight.*

Branches smooth. *Leaves* 4–7 by 1–$2\frac{1}{4}$ in., brown or greenish when dry, thin; nerves hardly stronger than the veins, very spreading; petiole $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in., coriaceous, broad, obtuse. *Cyme-peduncle* 1 in. and less; branches opposite sub-opposite and obscurely whorled, very stout, short, irregularly dichotomously divided; flowers nearly $\frac{1}{3}$ in. long. *Calyx* very short, limb quite entire. *Corolla* the longest of the Indian species, 4-lobed, glabrous without and within.—Wight labels this *Grumilea*, but there is no fruit advanced enough to determine this point.

DOUBTFUL AND EXCLUDED SPECIES.

P. WALLICHIANA, *DC. Prodr.* iv. 520. P. nervosa, *Don Prodr.* 137; "leaves oval

acuminate serrulate nerves glabrous, stipules simple, calyx-teeth rounded membranous, panicles terminal glomerate."—Nipal, *Wallich.*

I suspect that this is *P. denticulata* badly described. The term serrulate is applicable to no Rubiaceous genus but *Carlemannia*, which is not Nipalese, and which Don would never have referred to *Pyschotria.* The only other Nipalese species are *P. calocarpa*, which has broadly crenulate leaves, but slender calyx-teeth, and *P. erratica*, which differs in the cyme and calyx too.

P. SPHÆROCARPA, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 161; glabrous except the cymes, leaves petioled large broad elliptic acuminate or acute coriaceous, nerves strong close-set, cymes terminal peduncled compact subglobose villous, flowers subcapitate, fruit spherical smooth.—Silhet hills, *Wallich.*

Shrubby; branches thick, ends compressed. *Leaves* 8–12 in., base sometimes rounded, shining above; petiole 1 in., rounded; stipules large, ovate, 2-lobed, lobes acuminate. *Calyx-teeth* subulate. *Corolla-tube* short, throat villous. *Fruit* size of a large pea, petioled, without ribs; septum at length obliterated. *Seeds* hemispheric, ventral face flattened with a T-shaped groove.—I have seen no specimens, and have taken the description from Wallich. It evidently resembles *P. silhetensis*, of which the leaves are never rounded at the base, and the flowers not capitate; moreover, Wallich has *silhetensis* under another name. He says he received it in 1815 and 1821, and I find in his herb. a specimen of *P. fulva* marked as *P. sphærocarpa?*, received from Silhet in the latter year. Possibly *P. sphærocarpa* is made up of leaves and flowers of *fulva* and fruit of *silhetensis*, or it may be a form of *P. denticulata.*

P. VAGINANS, *DC. Prodr.* iv. 520, from Ceylon, is not identifiable from the description; it may be a *Gaertnera.*

P. ? VAGINANS, *DC. of W. & A. Prodr.* 434; *Wight Cat.* 1352.—I find no specimens of this in Wight's Herbarium, and, the fruit being unknown, it is unrecognisable.

P. (*Grumilea*) VAGINANS, *Dalz. mss. in Dalz. & Gibs. Bomb. Fl.* 111; shrubby, erect, glabrous, leaves large obovate, stipules ovate or lanceolate acute caducous $1\frac{1}{2}$–2 in. long, combined in a sheathing tube, cymes terminal peduncled paniculate 3-chotomous puberulous, flowers small white, fruit like a black peppercorn.—Chorla Ghat and Mahableshwur, rare.—I suspect this to be *P. truncata.*

P. AMPLA, *Wall. Cat.* 8333, is a *Pavetta.*

P. ASIATICA, *Linn. Amœn. Acad.* v. 395, is a Jamaican plant received by Linnæus from Patrick Browne, and is *P. Brownei*, Spreng.

P. OXYPHYLLA, *Wall. Cat.* 8374, is a *Gaertnera*, as are *Psychotria*, 8341, 8342, 8388, 8389.

PSYCHOTRIA, *Wall Cat.* 8362, is in part *Chasalia curviflora* and in part a *Morinda*; 8363 is in part *Chasalia curviflora* and in part a *Leea*; 8376 is an *Ixora*, as is 8387; 8379 is an *Apocynea.*

76. CHASALIA, *Comms.*

Characters of *Psychotria*, but corolla-tube usually slender and curved; seeds orbicular, dorsally much compressed, ventrally deeply concave, hence somewhat cup-shaped; albumen equable.—DISTRIB. About 10 species, tropical Asiatic and African.

1. **C. curviflora,** *Thw. Enum.* 150, 421; glabrous, leaves membranous from broadly elliptic to obovate-lanceolate oblanceolate or narrowly linear-oblong acute cuspidate acuminate or caudate-acuminate, base narrowed into a long or short petiole, nerves few or many, cymes terminal bracteate trichotomous dense- or lax-flowered, corolla tubular curved. *Kurz For. Fl.* ii. 14. C. lurida, curviflora, tetrandra (*excl. syn.* rostrata), *and* Sangiana, *Miq. Fl. Ind. Bat.* ii. 282, *Ann. Mus. Lugd. Bat.* iv. 202, 203, and *Fl. Ind. Bat. Suppl.* 546. Psychotria lurida, *Bl. Bijd.* 959; *DC. Prodr.* iv. 521. P. curviflora and ophioxyloides, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 167, 168, *Cat.* 8360, 8364; *DC. l. c.* 520. P. ambigua, *W. & A. Prodr.* 433; *Wt. Ic.* t. 127. P. tetrandra,

Bl. & DC. ll. cc. Zwardekronia lurida, *Korth. in Ned. Kruidk. Arch.* ii. 252. Ixora attenuata, *Wall. Cat.* 6164. Psychotria, *Wall. Cat.* 8361, 8362, 8363, 8364 (*in part*), 8375, 8386 (*a very narrow-leaved form*), 8390. Rubiacea, *Wall. Cat.* 8461.

EASTERN TROPICAL HIMALAYA; Sikkim, alt. 2–6000 ft. ASSAM, CACHAR, and the KHASIA MTS., ascending to 5000 ft. TENASSERIM, the ANDAMAN ISLANDS, MALAYAN PENINSULA, and PENANG. WESTERN PENINSULA; the Ghats from Bombay southwards. CEYLON, ascending to 4000 ft.—DISTRIB. Malay Islands to Borneo.

An evergreen small weak shrub 2–4 ft. high. *Leaves* greenish when dry, in the most frequent form obovate-lanceolate 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in. diam., narrowed into a slender petiole $\frac{1}{2}$–3 in. long; in a common Malayan form almost elliptic, in Tenasserim ones 8–10 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; in Ceylon ones they vary from $2\frac{1}{2}$–5 by $\frac{1}{2}$–$1\frac{1}{2}$ in., always membranous with slender distant nerves, arching upwards; stipules triangular or ovate or broader, acute obtuse or rounded, entire or 2-fid, often connate and persistent. *Cymes* rarely 2 in. long, more or less pyramidal or rounded; peduncle 2 in. long and under; branches short, soft, rather stout, often purplish; bracts persistent, ovate-lanceolate or subulate; flowers $\frac{1}{3}$–$\frac{2}{3}$ in. long, sufascicled, sessile, 4–5-merous. *Calyx* short, teeth triangular. *Corolla* variable in length, dimorphic, one form with exserted anthers and included stigmas, the other with these positions reversed; throat glabrous. *Fruit* size of a pea, globose, more or less didymous, smooth; pyrenes thin. *Seed* orbicular and cupular, smooth.—This plant was first published as a *Chasalia* by Miquel, in 1856, under the name of *C. lurida*, founded on Blume's *Psychotria lurida*; but Wallich's *P. curviflora* antedates Blume's *lurida* by two years, and as it is by far the most expressive specific name, and is also taken up as a *Chasalia* by Miquel after Thwaites (*Ann. Mus. Lugd. Bat.* iv. 202), I adopt it here.

VAR. 1. *longifolia*; leaves 8–12 by $1\frac{1}{2}$–2 in., nerves more numerous spreading. Psychotria longifolia, *Dalz. in Hook. Lond. Journ. Bot.* ii. 133, *not of Beddome*. Psychotria, *Wall. Cat.* 8386.—Cachar, *Keenan*; Bombay, *Dalzell*, *Stocks*; Malacca, *Maingay* (Kew Distrib. 3052).—Though so dissimilar, this is obviously an extreme form of *C. curviflora*, connected by intermediates; indeed, one specimen (from Cachar) has the lower part of the leaf with the numerous spreading nerves of the variety, and the upper part with the distant arched ones of the type.

VAR. 2. *ellipsoidea*; leaves as in the common form of the species, fruit ellipsoid. —Khasia Mts.; Jarain in Jyntea, alt. 3000 ft., *C. B. Clarke*.

2. **C. rostrata,** *Miq. in Ann. Mus. Lugd. Bat.* iv. 203, *excl. syn.* tetrandra; glabrous, leaves short-petioled elliptic-lanceolate caudate-acuminate, cymes terminal peduncled very small lax-flowered bracteate, corolla-tube very short. Psychotria rostrata, *Bl.* and Polyozus latifolia (*fid. Miquel*), *Bl. Bijd.* 961, 948; *DC. Prodr.* iv. 521, 494.

MALACCA, *Griffith* (Kew Distrib. 3045), *Maingay* (n. 937).—DISTRIB. Java.

Branches slender. *Leaves* 4–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in., greenish when dry, membranous, base acute; nerves 6–8 pair, arched; stipules short, broad, entire or toothed. *Cymes* slender, trichotomous, branches often drooping, few-flowered; bracts subulate; flowers minute. *Calyx-teeth* triangular. *Corolla* glabrous. *Fruit* much as in *C. curviflora*. —This unites *Psychotria* and *Chasalia*, having the flowers of *P. montana* and fruit of *C. curviflora*.

77. **GEOPHILA,** *Don.*

Small, slender, creeping, perennial herbs. *Leaves* long-petioled, orbicular reniform or cordate; stipules interpetiolar, ovate, entire. *Flowers* small, solitary or umbelled, subsessile or on axillary or terminal peduncles; bracts subulate linear or leafy. *Calyx-tube* obovoid, lobes or segments 5–7, slender, persistent. *Corolla* elongate funnel-shaped, throat hairy; lobes 4–7, valvate in bud. *Stamens* 4–7, on the corolla-throat, filaments filiform; anthers linear. *Ovary* 2-celled; style slender, arms short or long; ovules 1 basal, erect in each cell.

Drupe fleshy, pyrenes 2, plano-convex. *Seeds* plano-convex, not grooved ventrally; embryo basal, minute, radicle inferior.—DISTRIB. Species 8 or 10 tropical.

1. **G. reniformis,** *Don Prodr.* 136; pubescent, leaves orbicular deeply cordate, umbels 1–3-flowered peduncled. *DC. Prodr.* iv. 537; *W. & A. Prodr.* 436; *Wt. Ic.* t. 54; *Dalz. & Gibs. Bomb. Fl.* 111. G. diversifolia, *DC. l. c.*; *Wall. Cat.* 8325. Psychotria herbacea, *Linn.*; *Roxb. Fl. Ind.* i. 533. Cephaelis herbacea, *Kurz in Journ. As. Soc.* 1877, ii. 140.—*Rheede Hort. Mal.* x. t. 21.

SILHET and KHASIA HILLS, *Roxburgh, De Silva.* TENASSERIM and ANDAMAN ISLANDS, *Griffith, Kurz.* Western Peninsula; or the Ghats from the Concan southwards. CEYLON, common.—DISTRIB. Malay Archipelago, S. China, Polynesia, Tropical Africa and America.

Stems a foot or less long. *Leaves* $\frac{3}{4}$-1$\frac{1}{2}$ in. diam., more or less pubescent; petiole 1–3 in.; stipules ovate, obtuse. *Peduncle* $\frac{1}{4}$-1$\frac{1}{2}$ in.; bracts subulate-lanceolate. *Calyx-teeth* herbaceous, persistent. *Corolla* $\frac{1}{8}$-$\frac{1}{6}$ in., glabrous. *Fruit* small, globose, purple.

78. CEPHAELIS, *Swartz.*

Characters of *Psychotria*, but flowers in involucrate heads, ovary rarely 3–4-celled. *Albumen* equable.—DISTRIB. Species 70, all tropical.

The cultivation of Ipecacuanha (*Cephælis Ipecacuanha*, Rich.), an American plant, has been introduced into India, but with hitherto scanty success.

1. **C. Griffithii,** *Hook. f.*; leaves long-petioled oblanceolate acuminate, nerves 16–20 pair glabrous beneath, stipules 1 in. diam., heads sessile, bracts orbicular connate.

MALACCA, *Griffith* (Kew Distrib. 3032), *Maingay* (928).

Branches (or stem?) as thick as the little finger. *Leaves* 12–16 by 3–5 in., brownish when dry, narrowed into a petiole often 3 in. long, coriaceous; stipules very coriaceous, orbicular, upper half withered and discoloured. *Head* 1–2 in. diam.; bracts like the stipules. *Calyx-teeth* obtuse. *Corolla* $\frac{1}{6}$ in., glabrous, throat villous. *Fruit* $\frac{1}{3}$ in. long, obovoid-oblong, 4-angled, crowned by the tubular calyx-limb; pyrenes with a broad dorsal rib, ventrally concave. *Seed* very thin, pyrene dorsally ridged.—The more numerous nerves and sessile large heads distinguish this from the closely allied Malayan *C. stipulacea*, Bl.

2. **C. cuneata,** *Korth. in Ned. Kruidk. Arch.* ii. 248; leaves very narrowly oblanceolate acuminate, nerves quite glabrous beneath, stipules $\frac{1}{4}$ in. diam., heads stoutly peduncled, bracts connate. *Miq. Fl. Ind. Bat.* ii. 311.

MALACCA, *Griffith* (Kew Distrib. 3085), *Maingay* (929).

Stem simple, as thick as a goose-quill or less. *Leaves* 6–12 by $\frac{3}{4}$-1$\frac{1}{2}$ in., membranous, greenish when dry, narrowed into very long petioles; nerves very variable in number, ascending; stipules small, much withered and discoloured. *Heads* $\frac{1}{2}$ in. diam.; peduncle stout, simple, 2–4 in.; bracts connate in a coriaceous cup; flowers smaller and fewer than in *C. Griffithii.* *Calyx-teeth* rounded. *Fruit* $\frac{1}{3}$-$\frac{2}{3}$ in. long, almost globose, very fleshy, calyx-limb inconspicuous; pyrenes and seeds as in *C. Griffithii.*

79. LASIANTHUS, *Jack.*

Shrubs, often fœtid; branches terete, compressed at the nodes. *Leaves* opposite, distichous, usually caudate-acuminate with arching nerves and close-set transverse veins, which are simple or forked or branched and reticulate; stipules interpetiolar, broad, rarely narrow. *Flowers* small, in axillary rarely peduncled often bracteate clusters, cymes or heads. *Calyx-tube* short; limb

short or long, 3–7-toothed, rarely truncate, persistent. *Corolla* funnel- or salver-shaped, throat villous; lobes 3–7, valvate in bud. *Stamens* 4–6 on the corolla-throat, filaments short; anthers linear or oblong, often apiculate, included. *Ovary* 4–9-celled; style short or long, glabrous or hairy, arms or stigmas 3–9 short obtuse; ovules 1 linear basal erect in each cell. *Drupe* small, pyrenes 3–9, 3-quetrous and 1-seeded. *Seeds* narrow, testa membranous; embryo terete, radicle slender inferior.—DISTRIB. Species about 80 tropical Asiatic, with single species in Japan, Australia, W. Africa, and Cuba.

A very difficult genus to describe, though the nervation and venation of the leaves afford very good characters. The foliage closely resembles that of *Urophyllum.*

SECT. I. **Stipulares.** *Cymes* sessile, embraced by the large coriaceous stipules.

1. **L. Griffithii,** *Wight in Calc. Journ. Nat. Hist.* vi. 505; robust, leaves large elliptic-lanceolate caudate-acuminate narrowed into a very short petiole pubescent beneath, nerves 18–20 pair, veins reticulate, clusters of flowers large capitate very dense villous involucrate by the very large broad stipules, bracts densely filiform villous equalling the flowers.

MALACCA, *Griffith* (Kew Distrib. 2935).

Branches as thick as a swan's-quill, black when dry, glabrous. *Leaves* 10–12 by 3–3½ in., brown when dry, coriaceous, glabrous above, rusty beneath; nerves 16–20 pair; petiole very short and stout; stipules ¾ in. diam., broadly triangular, with rounded angles, acute or obtuse, very coriaceous and persistent, glabrous. *Heads* densely villous; bracts close-packed, filiform, equalling the flowers. *Calyx-limb* large, glabrous, funnel-shaped, about 7-cleft, teeth villous. *Corolla-tube* glabrous; limb villous, 7-cleft. *Drupe* small, nearly globose, about ⅙ in. diam., glabrous; pyrenes about 7.

2. **L. stipularis,** *Blume Bijd.* 997; slender, glabrous except the bracts, leaves subsessile oblanceolate-oblong caudate-acuminate, nerves 9–10 pair, veins faint sparingly branched, clusters of flowers small sessile involucrate by the large and broad stipules, bracts lanceolate ciliate exceeding the flowers. *Kurz For. Fl.* ii. 32. Mephitidia stipularis, *DC. Prodr.* iv. 453.

TENASSERIM OR ANDAMAN ISLANDS, *Helfer* (Kew Distrib. 2937).—DISTRIB. Sumatra, Java, Borneo.

An evergreen low shrub. *Leaves* 4–6 by 1–2 in., rather narrowed towards the subacute or rounded oblique base, greenish-brown when dry, membranous; midrib beneath sometimes with scattered hairs; nerves 10–12 pair, slender; petiole very short; stipules ⅓–½ in. diam., rounded or broadly triangular-ovate or oblong coriaceous, glabrous, very persistent, concealing the flowers. *Bracts* ½–1 in. long, often exceeding the stipules. *Calyx-teeth* hirsute, sometimes ⅓ in. long. *Corolla* white. *Drupe* ⅙ in. diam., subglobose, smooth; pyrenes 4–5.

SECT. II. **Bracteatæ.** *Cymes* sessile, not embraced by the large stipules, accompanied by evident long or short bracts. (Cymes peduncled in 5. *L. Moonii.*)

* *Bracts equalling or exceeding the flowers. Branches hirsute or tomentose.*

3. **L. cyanocarpus,** *Jack in Trans. Linn. Soc.* xiv. 125; hirsute, leaves petioled elliptic-lanceolate or oblanceolate caudate-acuminate, nerves 8–12 pair, veins lax sparingly branched, base acute, cymes sessile, bracts many ovate-lanceolate leafy exceeding the sessile flowers. *Kurz For. Fl.* ii. 32. L. bracteatus and L. Roxburghii, *Wight in Calc. Journ. Nat. Hist.* vi. 501, 502. L. oculus-cati, *Miq. Fl. Ind. Bat.* ii. 315. L. lævicaulis, *Kurz in Trimen. Journ. Bot.* 1875, 327. Lasianthus, ? *Wall. Cat.* 8440. Mephitidia cyanocarpa, *DC.*

Prodr. iv. 452. M. rhinozerotis, *Kurz in Andaman For. Rep., Append. A.* 40; *not of Blume?* Triosteum hirsutum, *Roxb. Fl. Ind.* i. 538. Rubiacea, *Wall. Cat.* 8305.

ASSAM, *Simons*; NAGA HILLS, *Griffith* (Kew Distrib. 2917); SILHET, CHITTAGONG, ANDAMAN and NICOBAR ISLANDS, TENASSERIM, SINGAPORE, MALACCA and PENANG, *Wallich*, &c.—DISTRIB. Malay Archipelago to Borneo.

An evergreen bush, softly hirsute all over, or with the branches and leaves above glabrate. *Leaves* 6–10 by 1½–2½ in., brown when dry; nerves 7–10 pair, very obliquely arched; petiole ¼–⅔ in.; stipules ovate, acute. *Bracts* ½–1½ in., outer ovate acuminate, inner lanceolate or subulate. *Calyx-teeth* linear, ciliate. *Corolla-tube* ⅙ in., hispid, yellow. *Drupe* (dry) ⅙–¼ in. long, broadly obovoid or subglobose, obscurely 4-lobed, glabrous or pubescent, bright blue, smooth; pyrenes 4–5.—Kurz and Jack describe the fruit as the size of a gooseberry. Wallich's specimen, 8305 A., is marked as from Herb. Madras; if correct, this is no doubt one of several plants procured by the missionaries from the Eastern Peninsula.

4. **L. Jackianus,** *Wight in Calc. Journ. Nat. Hist.* vi. 502; hirsute, leaves subsessile oblong abruptly acuminate or caudate-acuminate base rounded, cymes sessile, nerves 6–7 pair, veins rarely branched, bracts few outer ovate or linear-lanceolate exceeding the sessile flowers. *Bedd. Ic. Pl. Ind. Or.* t. 12. Lasianthus, *Wall. Cat.* 8439.

NILGHERRY MTS., *Heyne*, &c.; Sisparah Ghat, *Beddome.*

An evergreen bush, softly hirsute all over. *Leaves* 4–6 by 1½–2½ in., dark brown when dry; nerves 6–8 pair; petiole very short; stipules ovate, acute. *Bracts* rarely ovate-lanceolate, ½–1 in.; calyx-teeth 4 ovate-lanceolate, hispid, shorter than in *L. cyanocarpus*. *Drupe* ⅕ in. long, obtusely octahedroid smooth; pyrenes 4.

5. **L. Moonii,** *Wight in Calc. Journ. Nat. Hist.* vi. 504; hirsute, leaves petioled elliptic or elliptic-oblong acuminate base acute or rounded, nerves 7–8 pair, veins branched and reticulate, cymes capitate peduncled, bracts ovate-lanceolate about equalling the flowers. Mephitidia Moonii, *Thw. Enum.* 145.

CEYLON; Saffragam district, common, *Walker, Thwaites.*

Harshly hirsute. *Leaves* 5–7 by 1½–2½ in.; hispid or glabrous above, brown or greenish when dry; petiole stout, ⅓–⅔ in.; stipules ovate, acute. *Cymes* capitate, ½–¾ in. long and broad; peduncle stout, shorter than the petioles. *Calyx-teeth* linear-lanceolate, hispid. *Corolla* white, tube short. *Drupe* "red, hairy, size of a cherry," *Thwaites* (dry); ⅛–⅙ in. diam., globose, smooth; pyrenes 4.

6. **L. sikkimensis,** *Hook. f.*; branches petioles bracts and leaves beneath finely tomentose, leaves petioled lanceolate or elliptic-lanceolate finely acuminate, base acute, nerves 8–9 pair, veins often branched, bracts subulate longer than the few sessile flowers.

SIKKIM HIMALAYA, alt. 2–3000 ft., *J. D. H. & T. T.*

A shrub; branches with appressed hairs. *Leaves* 6–8 by 1¼–1¾ in., brownish when dry, glabrous above, nerves not impressed above, prominent beneath, veins slender parallel; petiole ¼–½ in.; stipules ⅙–¼ in., lanceolate. *Bracts* ¼–½ in. *Calyx-teeth* 5, narrow, lanceolate. *Drupes* subglobose (dry), ⅙ in. diam., nearly glabrous; pyrenes 5.

7. **L. Wallichii,** *Wight in Calc. Journ. Nat. Hist.* vi. 503; branches petioles and leaves beneath hirsute with spreading hairs, leaves small shortly petioled oblong or oblong-lanceolate cuspidate acuminate or acute, base rounded or cordate often unequally, nerves 7–8 pair, veins branched laxly reticulate, bracts subulate longer than or equalling the few axillary sessile flowers. *Wall. Cat.* 8442, *in part*; *Kurz For. Fl.* ii. 31. L. plagiophyllus, *Hance in Trimen Journ. Bot.* 1875, 196. Nonatelia? hispida, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 187. Mephitidea Wallichii, *W. & A. Prodr.* 390.

SILHET, ASSAM and KHASIA MTS., ascending to 2000 ft., *De Silva*, &c. MARTABAN, TENASSERIM and ANDAMAN ISLANDS, *Kurz*.—DISTRIB. Hongkong.

Shrubby. *Leaves* 4–6 by 1–$1\frac{1}{2}$ in., pale when dry, thinly coriaceous, above glabrous often shining, nerves beneath strong; stipules $\frac{1}{4}$ in., linear-lanceolate. *Bracts* $\frac{1}{2}$–1 in. *Calyx-teeth* 5, subulate-lanceolate. *Corolla-tube* $\frac{1}{6}$ in. (1 in., *Wallich*), white, hispid. *Drupe* $\frac{1}{6}$ in., ovoid, glabrous; pyrenes 5 (4–6, *Hance*).—This closely resembles *L. attenuatus*. I have seen no specimen from Kurz's localities.

VAR. ?*penangensis*; leaves narrower, base acute. Lasianthus? *Wall. Cat.* 8441 (*one sheet*).—Penang and Singapore, *Wallich*.– I suspect this to be a different species, but the specimens are insufficient.

8. **L. tentaculatus,** *Hook. f.*; branches glabrous, leaves subsessile oblong or obovate-oblong rather abruptly acuminate, base rounded unequal-sided, nerves 9 pair spreading minutely hairy beneath, veins branching, flowers sessile much shorter than the erect subulate or filiform hispid bracts, calyx-teeth linear hispid. Rubiacea, *Wall. Cat.* 8306.

SILHET, *Wallich*.

Branches pale when dry. *Leaves* 5–7 by 2–$2\frac{1}{2}$ in., pale green when dry, membranous, rather shining above, base of lower rounded, of upper acute; petiole $\frac{1}{10}$ in., hispid; stipules $\frac{1}{4}$–3 in., lanceolate-subulate, hispid. *Bracts* numerous, $\frac{1}{3}$–$\frac{3}{4}$ in., rigid. *Calyx* small. *Corolla-tube* $\frac{3}{4}$ in., narrow, hispid. *Drupe* not seen.

9. **L. attenuatus,** *Jack in Trans. Linn. Soc.* xiv. 126; slender, branches and leaves beneath softly hirsute, leaves subsessile oblong-lanceolate acuminate from a broad rounded or cordate base, nerves 9–10 pair, veins loosely reticulate faint, cymes sessile, bracts linear-lanceolate equalling the flowers. *Wight in Calc. Journ. Nat. Hist.* vi. 504. Mephitidia attenuata, *DC. Prodr.* iv. 452.

MALACCA, *Griffith* (Kew Distrib. 2926); ? SILHET, *De Silva*.—DISTRIB. Sumatra, Java.

Much branched. *Leaves* $2\frac{1}{2}$–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., pale when dry, rather membranous, base often oblique, glabrous above, petiole very short; stipules ovate-lanceolate. *Bracts* $\frac{1}{4}$ in. long, narrowed at the base. *Calyx-teeth* 4 linear acute. *Corolla* yellow, hairy within and without. "*Drupe* ovoid, hairy, dark blue, pyrenes 4," *Jack*.—In Wight's Herbarium this species is fastened on a sheet with *L. appressus*, to which his description of the moniliform hairs especially applies.

10. **L. appressus,** *Hook. f.*; branches petioles and leaves beneath and cymes hirsute with erect or appressed pale hairs, leaves small petioled oblong-lanceolate acute, base acute, nerves 6–7 pair deeply impressed above much raised beneath, veins straight sparingly forked, bracts subulate longer than the subsolitary flowers. Lasianthus, *Wall. Cat.* 8443 and 8442, *in part*.

PENANG, *Wallich*. MALACCA; Mount Ophir, *Griffith* (Kew Distrib. 2927).

Branches with very dense stiff fulvous strongly septate hairs. *Leaves* 2–3 by $\frac{3}{4}$–1 in., coriaceous, very pale when dry, shining and glabrous except on the hairy midrib above, nerves above slender; petiole $\frac{1}{6}$ in., shaggy, stout; stipules lanceolate. *Bracts* stiff, erect, $\frac{1}{4}$ in. *Flowers* very small. *Drupe* $\frac{1}{10}$ in. diam., subglobose, crowned by the triangular acute calyx-teeth, glabrous; pyrenes 8.

11. **L. retosus,** *Wight in Calc. Journ. Nat. Hist.* vi. 506; branches and cymes hirsute with spreading hairs, leaves shortly petioled oblong-lanceolate, midrib pubescent and 12 pair of nerves deeply impressed above, very prominent and pubescent beneath, veins straight often forked, cymes sessile small few-flowered, bracts linear or lanceolate equalling the flowers, drupes glabrous subglobose with long calyx-teeth.

MALACCA, *Griffith* (Kew Distrib. 2918).

Leaves 5 by 1½ in., pale greenish brown when dry, shining above, base rounded or subacute, veins strong prominent beneath; petiole very short; stipules small, ¼ in., triangular-lanceolate. *Bracts* ¼–⅓ in., few. *Calyx-teeth* 5, very slender, hirsute. *Corolla* 7-cleft (*Wight*). *Drupe* subglobose, not longer than its calyx-teeth, about ⅙ in. diam., smooth; pyrenes 6–8.

12. **L. pilosus,** *Wight in Calc. Journ. Nat. Hist.* vi. 506; branches and cymes hirsute with spreading hairs, leaves shortly petioled oblong-lanceolate caudate-acuminate, midrib pubescent, veins reticulating and 15–20 pair of nerves not deeply impressed above pubescent beneath, cymes sessile few-flowered, bracts subulate equalling or shorter than the flowers, drupes glabrous subglobose with long calyx-teeth.

MALACCA, *Griffith, Cuming, Maingay* (Kew Distrib. 869).

Very similar to *L. retosus*, but the leaves are larger, 4–7 by 1½–2½ in., more membranous, their bases cordate, the more numerous nerves are hardly impressed. *Calyx* hispid; teeth 5–7, filiform. *Corolla-tube* hairy, lobes 5–7. *Drupe* as in *L. retosus*, as long as its calyx-teeth; pyrenes 5–7.

VAR. ? *angustifolia*; branches more densely hirsute, leaves narrower hispid above.—Tenasserim, at Mergui, *Griffith.*

13. **L. densifolius,** *Miq. Fl. Ind. Bat.* ii. 321; branches leaves on both surfaces and cymes hirsute with spreading hairs, leaves subsessile small close-set linear-oblong acuminate, base cordate, nerves 10–12 pair not impressed above, veins very faint loosely reticulate, cymes sessile few-flowered, bracts lanceolate or subulate, drupes pubescent 4-lobed, calyx-teeth inconspicuous. Lasianthus? *Wall. Cat.* 8441, *in part.*

MALACCA, PENANG, and SINGAPORE, *Wallich, Maingay* (Kew Distrib. 868). &c.—
—DISTRIB. Banka, Java.

Much smaller than the two preceding; internodes ½ in. *Leaves* 1½–2½ by ½–⅔ in., equally hairy on both surfaces, dirty greenish when dry; stipules lanceolate, much longer than in *L. pilosus*. *Bracts* few, ¼ in. *Flowers* not seen. *Drupe* ⅙ in. long, deeply 4-lobed, with very minute calyx-lobes; pyrenes 4 (4–5, *Miquel*).

14. **L. crinitus,** *Hook. f.*; branches petioles and leaves beneath rusty-tomentose, leaves oblong acute or obtuse coriaceous, base rounded glabrous above with 8–9 pair of very indistinct nerves, veins much branched and reticulate, clusters of flowers capitate sessile dense concealed amongst the numerous filiform subsquarrose hirsute bracts. Lasianthus? *Wall. Cat.* 8441, *in part.*

PENANG or SINGAPORE, *Wallich.*

Leaves 5–6 by 1¼–1½ in., red brown when dry, nerves and veins prominent beneath. *Cymes* meeting and almost embracing the stem, forming sessile heads ¼ in. across; bracts ⅓ in. long, several to each flower. *Buds* hirsute, minute.—Of this very peculiar species I have seen a fragment in bud only in Wallich's Herbarium, fastened on a sheet with *L. densifolius.*

15. **L. ellipticus,** *Wight in Calc. Journ. Nat. Hist.* vi. 507; branches petioles and bracts hirsute with spreading hairs, leaves shortly petioled broadly elliptic or subobovate-lanceolate acuminate, glabrous shining above with 6–8 pair of slender nerves and numerous parallel rarely forked veins which are finely silky beneath, bracts lanceolate longer than the few sessile fascicled flowers.

MALACCA, *Griffith* (Kew Distrib. 2934).

Branches not densely hirsute. *Leaves* 4–6 by 1½–2½ in., pale brown when dry, thinly membranous, base acute, very shining above; petiole ⅛ in.; stipules ¼ in., lanceolate. *Bracts* ¼–½ in. *Calyx-teeth* 5, ⅛–⅙ in., triangular-lanceolate, hirsute. *Corolla* not seen (hairy, 5-cleft, *Wight*). *Drupe* ⅙ in. long, obovoid, hairy; pyrenes 5.

** *Bracts much shorter than the flowers.*

16. **L. tubiferus,** *Hook. f.*; glabrous, or nerves beneath and bracts puberulous, leaves petioled elliptic or elliptic-lanceolate narrowed and acuminate at both ends, nerves 5–6 pair, veins sparingly branched, flowers sessile clustered longer than the orbicular coriaceous bracts, calyx-limb campanulate shortly 5-toothed tubular after flowering. Mephitidia, No. 9 *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA HILLS, alt. 3–5000 ft., *Griffith*, &c. (Kew Distrib. 2923, 4, 5).

Branches dark brown or black when dry. *Leaves* 5–7 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., rather rigid, brown when dry, opaque above; petiole $\frac{1}{6}$–$\frac{1}{3}$ in.; stipules small, $\frac{1}{6}$–$\frac{1}{4}$ in., triangular. *Bracts* coriaceous, glabrous and ciliate or pubescent. *Calyx* the largest of the Indian species, $\frac{1}{3}$ in., black, glabrous or pubescent; limb cylindric after flowering, and as long and nearly as broad as the ovary, coriaceous, with 5 erect triangular or lanceolate hispid teeth. *Corolla-tube* longer than the calyx, pubescent, throat villous. *Drupe* $\frac{1}{2}$ in., ovoid, black, crowned by the broad calyx-limb; pyrenes 5.

17. **L. oblongifolius,** *Bedd. Ic. Pl. Ind. Or.* t. 11; branches glabrous, petioles and nerves beneath and stipules strigose, leaves oblong or elliptic-oblong abruptly caudate-acuminate, base rounded or subacute, nerves 7 pair, veins close-set prominent sparingly branched, petiole and subulate bracts and flowers sessile fascicled hispid, calyx-teeth 5 triangular-lanceolate.

TINNEVELLY; in the Pampanussam hills, alt. 2500 ft., *Beddome.*

Shrubby. *Leaves* 6–7 by 2 in., midrib and prominent nerves slightly strigose, veins parallel and venules also very prominent; petiole $\frac{1}{2}$ in.; stipules triangular. *Flowers* 2–5 in a cluster. *Corolla-tube* very short, lobes 4.

18. **L. obscurus,** *Blume in DC. Prodr.* iv. 453 (Mephitidia); branches petioles stipules and nerves beneath softly tomentose, leaves petioled elliptic-lanceolate finely acuminate, base acute, nerves 7–8 pair, veins faint rarely forked, flowers fascicled sessile, bracts strigose outer ovate or oblong inner filiform or subulate, calyx-teeth lanceolate.—*Miquel Fl. Ind. Bat.* ii. 317.

MARTABAN, at Moulmein, *Parish*; SOUTH ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Sumatra, Java.

Branches almost black when dry, hairs spreading, soft. *Leaves* 4–7 by 1–2 in., greenish brown when dry, smooth and opaque above, with the midrib often pubescent, beneath pubescent on and between the nerves; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules $\frac{1}{4}$ in., oblong-triangular, substrigose. *Flowers* not numerous; bracts scattered, $\frac{1}{6}$–$\frac{1}{4}$ in.; calyx-limb cleft to the base. *Drupe* glabrous, "snow-white," *Parish*; pyrenes 5.—The Moulmein specimen precisely accords with the Sumatran and Javanese.

19. **L. Kurzii,** *Hook. f.*; branches petioles and nerves beneath hoary with minute appressed pubescence, leaves shortly petioled elliptic-oblong or lanceolate finely acuminate, base acute, nerves 9–10 pair, veins faint straight not reticulate, bracts outer ovate inner lanceolate equalling the fascicled sessile strigose flowers, calyx-teeth 5–7 lanceolate. L. stercorarius, *Kurz For. Fl.* ii. 31, *not of Blume.* Rubiacea, *Wall. Cat.* 8310, 8311.

MARTABAN, at Chappedong, *Wallich*; TENASSERIM and ANDAMAN ISLANDS, frequent, *Kurz*; PENANG ? *Wallich.*

Branches pale reddish-brown, smooth. *Leaves* 5–8 by $1\frac{1}{4}$–2 in., firmly membranous, pale brown when dry, smooth and opaque above, finely softly pubescent on the nerves beneath, veins close-set; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in., oblong-lanceolate, pubescent. *Bracts* glabrous or ciliate, small, outer more or less confluent, membranous, shorter than the flowers, inner ovate. *Calyx* strigose; limb dilated, deeply cleft. *Corolla* infundibular, $\frac{1}{6}$ in., slender. *Drupe* very small, glabrous; pyrenes 5–7.—Wallich's 8310 and 8311 appear conspecific, and as his habitat of Penang is given with a doubt, they probably both come from Martaban; No. 8310 has a 6–7-cleft

calyx, larger leaves, and less crowded flowers, of which the corolla has dropped. I have seen no specimen of Kurz.

SECT. III. **Nudifloræ.** *Cymes* sessile. *Bracts* very inconspicuous, minute subulate or 0.

* *Calyx-teeth elongate, lanceolate, rarely large and broad.*

20. **L. lucidus,** *Blume Bijd.* 997; branches glabrous or minutely strigose, leaves petioled elliptic-ovate-oblong or -lanceolate caudate-acuminate, base acute, nerves 4–6 pair minutely hairy beneath, veins distant sparingly branched, flowers few sessile ebracteate, calyx-teeth lanceolate. *Miq. Fl. Ind. Bat.* ii. 319; *Kurz For. Fl.* ii. 30. Mephitidia lucida, *DC. Prodr.* iv. 453. Mephitidia No. 17, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–6000 ft., *Griffith, J. D. H. & T. T.*, &c. UPPER TENASSERIM; Tabora (*fid. Kurz*).—DISTRIB. Java.

Branches slender, pale. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., green when dry, membranous, sometimes rather oblique; petiole slender, $\frac{1}{8}$–$\frac{1}{4}$ in., strigose; stipules minute, $\frac{1}{8}$ in., triangular, acute, strigose. *Flowers* 2–3, small, sessile or very shortly pedicelled, calyx-teeth glabrous or strigose. *Corolla* $\frac{1}{3}$ in., white; tube slender, hairy; lobes hairy within. *Drupe* $\frac{1}{4}$ in. diam., pale blue, glabrous, smooth, crowned by the calyx-teeth; pyrenes 4.

21. **L. Hookeri,** *C. B. Clarke mss.*; branches petioles stipules and nerves beneath puberulous or minutely strigose, leaves petioled elliptic-lanceolate caudate-acuminate, base subacute or rounded, margins obscurely waved or crisped, nerves 5 pair, veins sparingly forked, flowers sessile fascicled ebracteate, calyx-teeth lanceolate. Mephitidia No. 18, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., near Churra, alt. 4000 ft., *J. D. H. & T. T., C. B. Clarke.*

Branches pale. *Leaves* often deflexed, 6–9 by 1–$2\frac{1}{2}$ in., pale green when dry, opaque, rigidly membranous; nerves obliquely arched; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules $\frac{1}{6}$ in. *Flowers* 3–8 in a fascicle; bracts very minute or 0. *Calyx* glabrous or nearly so, teeth erect. *Corolla-tube* hairy. *Drupe* ovoid, $\frac{1}{6}$ in. diam., crowned by the calyx-limb and teeth; pyrenes 6.

22. **L. Blumianus,** *Wight in Calc. Journ. Nat. Hist.* iv. 507; glabrous except at the bases of the flowers and tips of the shoots, leaves stoutly petioled elliptic-lanceolate caudate-acuminate, base subacute or obtuse, nerves 4–5 pair, veins very slender branched and reticulate, flowers sessile or subsessile, bracts minute subulate, calyx-teeth lanceolate membranous much longer than the tube. *Bedd. Ic. Pl. Ind. Or.* t. 22.

TRAVANCORE, at Courtallam, alt. 3500 ft., *Wight, Beddome.*

Branches slender, pale. *Leaves* 3–6 by 1–2 in., greenish or brown when dry, stiffly membranous, opaque above, with faint arching nerves; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules triangular-lanceolate, $\frac{1}{6}$ in., glabrous or pilose. *Flowers* few or crowded, on a thickened pubescent axis, sometimes very shortly pedicelled; bracts rarely $\frac{1}{6}$ in., strigose. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in. long, tube short; lobes 4–5, narrow, erect. *Corolla* glabrous or nearly so, tube hardly equalling the calyx. *Ovary* "3–5-celled," *Wight.* *Drupe* not seen.—The calyx is quite peculiar.

23. **L. ciliatus,** *Wight in Calc. Journ. Nat. Hist.* vi. 509; branches petioles leaves beneath and cymes densely villously hirsute with spreading hairs, leaves stoutly petioled elliptic-oblong acute or acuminate coriaceous, base acute, nerves 6–8 pair deeply impressed above, veins beneath strong often forked, bracts obsolete, flowers sessile fascicled 3–4-merous, calyx-teeth broad large.

NILGHERRY MTS.; Sisparah, *Wight*, &c.

Branches stout, densely clothed with fulvous or brown hairs. *Leaves* 6–8 by 1–$1\frac{3}{4}$ in., yellowish brown when dry, opaque, with glabrous nerves above, margins usually

strongly ciliate, veins beneath strong, parallel; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules $\frac{1}{6}$–$\frac{1}{3}$ in., lanceolate, hirsute. *Bracts* replaced by stiff bristly hairs. *Calyx-teeth* obconic; lobes 3–4, broadly oblong, obtuse, hispid. *Corolla* " small, very hairy on both sides," *Wight*. *Drupe* size of a pea, subglobose, glabrous; pyrenes 3–4, rugose on the back.

VAR. *rostrata*; leaves shorter more cuspidate, venules closer. L. rostratus, *Wight Ic.* 510.—Shevagherry hills and Courtallam, *Wight*.

24. **L. Thwaitesii,** *Hook. f.*; branches slender and petioles and leaves beneath softly tomentose, leaves petioled lanceolate acuminate, coriaceous, base acute nerves 4 pair obscure above, veins laxly reticulated, flowers few or subsolitary sessile ebracteate, calyx tomentose, lobes lanceolate spreading. Mephitidia tomentosa. *Thw. Enum.* 145.

CEYLON; Ambagamowa district, alt. 3000 ft., *Thwaites*.

Branches slender, pubescence dark brown. *Leaves* 2–4 by $\frac{1}{2}$–1 in., coriaceous, brown when dry, rather shining above, rusty-brown beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules $\frac{1}{6}$ in., lanceolate. *Flowers* small, $\frac{1}{4}$ in. long. *Calyx-tube* campanulate. *Corolla* white, pubescent, tube short. *Drupe* " size of a pea, black," *Thwaites*.—Thwaites considers this closely allied to, and perhaps a form of *Gardneri*. I have seen but one specimen of each, and they are very dissimilar.

25. **L. rhizophyllus,** *Thw. Enum.* 145 (Mephitidia); branches slender compressed scabrid, leaves petioled lanceolate long acuminate, membranous glabrous shining, base acute, veins delicate, flowers few sessile, calyx hairy, teeth rather long linear-lanceolate.

CEYLON; Adam's Peak, *Gardner*.

Leaves 2–3 by $\frac{1}{2}$–1 in., petiole $\frac{1}{2}$–$\frac{1}{6}$ in.—The above description is copied from Thwaites, whose specimens are not perfect enough to enable him to complete the diagnosis.

** *Calyx-teeth minute, subulate or triangular.*

26. **L. strigillosus,** *Hook. f.*; branches petioles and nerves beneath strigillose with appressed soft hairs, leaves petioled narrowly oblong-lanceolate acuminate, base acute or rounded, nerves 8 pair strong beneath, veins sparingly forked, bracts obsolete, flowers few sessile 5-merous, calyx-teeth minute triangular. L. acuminatus, *Wight Herb.* Rubiacea, *Wall. Cat.* 8324, *in part*.

TRAVANCORE; Shevagherry Hills and Courtallam, *Wight*.

Branches rather short. *Leaves* 4–6 by 1–1$\frac{1}{2}$ in., pale when dry, rigid, coriaceous, not ciliate, midrib and nerves glabrous and rather raised above; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules $\frac{1}{6}$ in., triangular. *Flower* subsolitary or fascicled, sessile. *Calyx* hispid. *Corolla* hirsute, tube probably elongate. *Drupe* (unripe) $\frac{1}{6}$ in. diam., glabrous, crowned with the triangular calyx-teeth.—Allied to *L. truncatus*, Bedd., but the nervation and calyx are different. Wallich's specimen on the same sheet with *L. venulosus* (also a Western Peninsula plant) is marked by error as from Silhet. Near *L. ciliatus*, but the leaves are nearly glabrous beneath and the calyx-teeth very different.

27. **L. acuminatus,** *Wight in Calc. Journ. Nat. Hist.* vi. 511; branches petioles and nerves beneath appressed puberulous or glabrate, leaves petioled elliptic-lanceolate finely acuminate thin and rigid, base acute, nerves 5 pair strong, veins very close, flowers 1–3 sessile ebracteate, calyx hairy, teeth triangular, corolla glabrous externally.

TRAVANCORE; Pulney and Shevagherry Hills, alt. 7000 ft., *Wight*, *Beddome*. MALABAR? *Stocks*. NILGHERRY MTS., at Conoor, alt. 6000 ft., *C. B. Clarke*.

Branches slender, pale. *Leaves* 4–5 by 1–1$\frac{1}{2}$ in., pale greenish brown when dry, nerves beneath pale, veins closer than in any Indian species except *L. parvifolius*; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules $\frac{1}{6}$ in., triangular-lanceolate. *Flowers* 3–4-merous. *Calyx* hirsute, teeth minute. *Corolla-tube* $\frac{1}{10}$ in., glabrous, hairy within. *Ovary* 3–4-celled. *Drupe* not seen.

28. **L. parvifolius,** *Wight in Calc. Journ. Nat. Hist.* vi. 512; quite glabrous, leaves small petioled elliptic acute shining above coriaceous, base acute, nerves 2–3 pair strong, veins very close much forked, flowers 2–3 sessile 4-merous, bracts minute or obsolete, calyx-teeth small obtuse, corolla glabrous externally.

TRAVANCORE; Courtallam, *Wight*.

Branches slender. *Leaves* 1½–2 by ⅔–1 in., pale brown when dry; petiole ⅛–¼ in.; stipules $\frac{1}{10}$–⅛ in., triangular, acute. *Flowers* very small. *Calyx* glabrous; teeth minute, triangular. *Corolla-tube* ¼ in., glabrous; throat and lobes within hairy. *Drupe* "size of a pea," *Wight*, globose, glabrous; pyrenes 3–4.

29. **L. obovatus,** *Bedd. Ic. Pl. Ind. Or.* t. 10; glabrous, leaves small petioled obovate obtuse coriaceous, nerves 4–5 pair and veins very indistinct, flowers 1–3 sessile ebracteate, calyx-teeth ovate or triangular.

TRAVANCORE, on the Athramallay Mts., alt. 5000 ft., *Beddome*.

Shrubby, much branched; branches very short with short internodes, black. *Leaves* hardly distichous, 1 by ⅔ in. almost black when dry, with recurved margins; petiole ⅛–⅙ in.; stipules triangular, ⅛ in. *Flowers* 4-merous. *Calyx* campanulate, puberulous; teeth ovate or triangular. *Corolla-tube* very short, glabrous, throat villous. *Drupe* not seen.

30. **L. Walkerianus,** *Wight in Calc. Journ. Nat. Hist.* vi. 512; quite glabrous or young shoots puberulous, leaves petioled elliptic-oblong or -lanceolate or obovate apiculate acute or acuminate very coriaceous, nerves 7–8 pair very slender, veins copiously reticulate hardly parallel, flowers fascicled sessile, bracts 0, calyx-teeth 4 small triangular obtuse. Mephitidia Walkeriana, *Thw. Enum.* 146. M. varians, *Thw. l. c. in part* (C. P. 290).

CEYLON; Central Province, alt. 5–6000 ft., *Macrae, Walker*, &c.

Thwaites distinguishes this doubtfully as a species from *L. strigosus* by the narrower more acuminated leaves almost or wholly glabrous beneath, and shorter flowers; but these are not the characters of Wight's authentic specimens, which have shorter more coriaceous leaves than *L. strigosus*, with very much reticulated venules; in small specimens the leaves are only 2 in. long, obtuse and apiculate, with a longer petiole in proportion. It looks more like a mountain dwarf form of *L. strigosus* with rigid leaves and small flowers, but the calyx is quite different; it accords with Thwaites' sessile flowered form of *Mephitidia varians*.

VAR. *lanceolatus*; leaves narrowly lanceolate 3–5 by ½–1 in.—Ceylon, *Macrae* and *Thwaites* (C. P. 80, 340, 1728).

31. **L. oliganthus,** *Thw. Enum.* 146 (Mephitidia); branches slender tips and petioles appressed pubescent, leaves elliptic-lanceolate long-acuminate membranous shining, nerves 5 pair very slender hardly distinguishable from the laxly reticulating veins, flowers subsolitary ebracteate.

CEYLON; Hantani district, *Thwaites*.

Very closely allied to *L. strigosus*, and, as Thwaites remarks, probably a form growing in poor dry soil, but the nervation of the leaf is different. The only specimens seen have no flowers; Thwaites describes them as in few-flowered heads, small, with short acute calyx-teeth.

32. **L. Gardneri,** *Thw. Enum.* 145 (Mephitidia); stem stout glabrous or nearly so, leaves large petioled oblong-lanceolate acuminate, base acute glabrous or hairy on the 8 pair of nerves beneath, veins faint and reticulated, flowers crowded sessile ebracteate, calyx substrigose, teeth ovate-lanceolate acute.

CEYLON; Newera Ellia and Adam's Peak, *Gardner*.

Branches black, as thick as a goose-quill. *Leaves* 3–8 by 1⅓–2½ in., brown when dry, coriaceous, opaque; petiole ⅙–¼ in., glabrous or strigose; stipules very small, ⅙

in., triangular strigose. *Flowers* rather numerous; bracts 0 or minute, subulate. *Calyx* black, tube obconic; teeth coriaceous, hispid at the tips. *Corolla* "somewhat hairy without, villous within, tube short," *Thwaites.*—I have seen but one specimen from Adam's Peak (C. P. 348), which differs from Thwaites' description in the glabrous branches, and in the veins being only obscurely parallel (for the genus); it a good deal resembles a form of *L. strigosus.*

33. **L. inconspicuus,** *Hook. f.*; glabrous, leaves petioled elliptic caudate-acuminate opaque above, base acute, nerves 5–6 pair spreading and veins inconspicuous, flowers clustered sessile small ebracteate, calyx-teeth 5 triangular acute. Hyptianthera stricta, *Wall. Cat.* 8313 L.

SILHET, *Wallich.*

Branches very slender, strict, quite glabrous except the youngest tips. *Leaves* 3½–5 by 1¼–to 1¾ in., rigid, dull greenish when dry, tip very long and slender; nerves very obscure above, veins beneath visible rather distant branched; petiole slender, ¼ in., puberulous; stipules small, triangular, tips pubescent. *Flower* in very small pubescent axillary clusters. *Calyx* glabrous; limb dilated, cup-shaped; teeth erect. *Corolla-tube* slender, pubescent (seen in bud only about ¼ in. long). *Drupe* ⅙ in. diam., globose, smooth, crowned by the calyx-teeth; pyrenes 4–5.

34. **L. lancifolius,** *Hook. f.*; branches above petioles and midrib beneath hoary-puberulous, leaves petioled long narrowly oblong-lanceolate caudate-acuminate membranous, nerves 9 pair very slender, veins horizontal sparingly forked, flowers sessile ebracteate, calyx-teeth subulate short. Mephitidia, 12 *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 3–4000 ft., *Griffith* (Kew Distrib. 2916), *J. D. H. & T. T.*

Branches pale. *Leaves* 7–9 by 1–1¾ in., greenish when dry, somewhat shining on both surfaces; petiole ¼–½ in.; stipules ⅛–⅙ in., narrowly triangular, villous. *Flowers* crowded. *Calyx* puberulous. *Corolla-tube* ½ in., puberulous, slender; lobes hairy within. *Drupes* ¼ in. diam., globose, blue; pyrenes 5.

35. **L. chinensis,** *Benth. Fl. Hongk.* 160; branches short petioles nerves beneath and flowers finely appressed pubescent, leaves large stoutly petioled elliptic-lanceolate caudate-acuminate coriaceous, base acute, nerves 10–12 pair, veins much reticulated, flowers sessile clustered ebracteate, calyx-teeth small narrow ovate-lanceolate. Mephitidia chinensis, *Champ. in Kew Journ. Bot.* iv. 196.

MALACCA; Pulo Bissar forest, *Griffith* (Kew Distrib. 2920), *Maingay* (865).—DISTRIB. Hongkong, Formosa.

Branches as thick as a goose-quill, black when dry. *Leaves* 6–8 by 1¾–2¼ in., brown when dry, rather shining and quite glabrous above; nerves not strong above, prominent beneath; petiole ⅓–½ in.; stipules small, ⅙ in., narrowly triangular. *Calyx-limb* campanulate, tomentose. *Drupe* subglobose, obtusely angled, ⅙ in. diam., pubescent, crowned by the calyx-teeth; pyrenes 4–5.

36. **L. longifolius,** *Wight in Calc. Journ. Nat. Hist.* vi. 514; branches stout glabrous, leaves very large shortly stoutly petioled elliptic-oblong or oblong-lanceolate acuminate shining above scabrid beneath, base acute, nerves 15–18 pair, veins much reticulated, stipules very coriaceous, flowers sessile crowded ebracteate or bracts minute, calyx-teeth short triangular.

MALACCA, *Griffith* (Kew Distrib. 2936), *Maingay* (867).

Branches as thick as a goose-quill, black when dry. *Leaves* 12–16 by 3½–4½ in., thinly coriaceous, brown when dry, nerves moderately arching, scabridity of under-surface from rigid minute hairs on the nerves to microscopic points on the leaf-surface; petiole ¼ in., black, glabrous; stipules ¼–½ in. long, oblong-ovate, obtuse, very coriaceous, glabrous. *Flowers* sessile and subsessile; bracts minute, subulate, strigose. *Calyx* hemispheric, black, glabrous; limb shortly tubular, truncate or obscurely irre-

gularly toothed. *Corolla* infundibular; tube glabrous, hardly exceeding the calyx-limb; lobes 5, triangular-lanceolate, narrow, villous within. *Ovary* 7-celled. *Drupe* unripe, glabrous, crowned with the tubular calyx-limb.—This very fine species is by the stipules and other characters closely allied to *L. Helferi*, next which it should rank though it has minute bracts.

37. **L. Maingayi,** *Hook. f.*; branches petioles nerves beneath and flowers minutely substrigosely appressed-pubescent, leaves large shortly petioled elliptic-oblanceolate or elliptic-oblong membranous acuminate, base acute, nerves 7 pair, veins strong sparingly reticulate, flowers densely clustered sessile and shortly pedicelled ebracteate, calyx-teeth 4 triangular minute.

MALACCA, *Maingay* (Kew Distrib. 871).—DISTRIB. Sumatra.

Branches slender for the size of the foliage, minutely granulate, pale yellowish red when dry, and rather rough to the touch. *Leaves* 8–10 by 2½–3½ in., pale greenish when dry, thinly scaberulous beneath, opaque on both surfaces, nerves oblique; petiole ⅛ in.; stipules very small, ⅙ in., triangular, acute, strigose. *Flowers* crowded. *Calyx* short, pubescent. *Corolla* funnel-shaped, ⅙ in. long, puberulous or glabrate; lobes pubescent within. *Drupe* not seen.

38. **L. pterospermus,** *Wight in Calc. Journ. Nat. Hist.* vi. 510; branches petioles and nerves beneath glabrous or finely puberulous, leaves subsessile oblong or elliptic-oblong acuminate, base rounded often oblique rarely acute, nerves 10–12 pair, veins reticulate, flowers sessile crowded hispid, calyx-teeth triangular, pyrenes 2-winged.

MALACCA, *Griffith* (Kew Distrib. 2929), *Maingay* (866).

Branches as thick as a crow-quill. *Leaves* 4–7 by 1½–2¼ in., pale brownish when dry, rather coriaceous; petiole $\frac{1}{10}$ in.; stipules oblong-lanceolate, ⅓ in., strigose. *Flowers* numerous, bracts very minute or 0. *Calyx* hispid. *Corolla* glabrate. *Drupe* large, ½ in. diam., globose, glabrous, black, crowned by the shortly tubular calyx-limb; pyrenes 3–5, trigonous, with a longitudinal wing on each side of the convex or keeled back.—Wight is in error in calling the stipules small.

39. **L. Wightianus,** *Hook. f.*; branches petioles and leaves beneath scaberulous or strigillose, leaves petioled oblong acuminate rigid, base subacute or rounded, nerves 12–13 pair, veins branched and reticulate, flowers sessile clustered ebracteate, calyx-teeth triangular. L. venosus, *Wight in Calc. Journ. Nat. Hist.* vi. 514, *not of Blume.*

MALACCA; on Mt. Ophir, *Griffith.*

Branches very stout, woody, brown. *Leaves* 3–4 by 1–1¼ in., dark brown when dry, midrib and nerves very strong beneath, pubescent on both surfaces; petiole ⅛ in., stout; stipules ⅙–¼ in., broadly triangular or lanceolate, coriaceous, hirsute. *Flowers* few. *Calyx* ⅛ in., fulvous-pubescent. *Corolla* (in bud) hirsute. *Drupe* not seen.

*** *Calyx-limb tubular or cupular, truncate or minutely toothed.*

40. **L. constrictus,** *Wight in Calc. Journ. Nat. Hist.* vi. 515; branches petioles stipules and nerves beneath sparsely strigose, leaves petioled oblong-lanceolate acuminate, base acute, nerves 5–6 pair, veins loosely reticulate, flowers small sessile crowded subebracteate, calyx constricted at the base of the cupular shortly 4-toothed limb. *Kurz For. Fl.* ii. 31. Mephitidia sp., *Griff. Notul.* iv. 267, t. 474, f. 4.

TENASSERIM and the ANDAMAN ISLANDS, *Griffith, Kurz.*

Branches slender, pale. *Leaves* 3–7 by 1–1½ in., very pale. yellowish brown, hardly shining, texture thin; petiole ⅙ in.; stipules small, ⅙ in., triangular, acuminate. *Flowers* pale, sparsely pubescent; bracts 0 or minute, subulate, deciduous. *Calyx* $\frac{1}{12}$ in., tube ellipsoid. *Corolla* "hirsute, tube ¼ in., lobes as long. *Drupe* ovoid, size of a small pea, glabrous, crowned by the large almost truncate calyx-limb": *Kurz.*

41. **L. pauciflorus,** *Wight in Calc. Journ. Nat. Hist.* vi. 515; branchlets petioles and leaves beneath softly hispid with close-set spreading white hairs, leaves subsessile elliptic-lanceolate acuminate, base acute, nerves 4–5 pair, veins faint loosely reticulate, flowers few sessile ebracteate.

TENASSERIM; at Mergui, *Griffith.*

Branches very slender, pale straw-coloured. *Leaves* 3–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., very thin, pale brownish when dry, glabrous above; petiole $\frac{1}{12}$ in.; stipules lanceolate with long subulate points, strigose, deciduous.

42. **L. truncatus,** *Bedd. Ic. Pl. Ind. Or.* t. 9; branches petioles and nerves beneath appressed-pubescent, leaves petioled narrowly elliptic-lanceolate finely acuminate, base acute, nerves 7–8 pair and parallel, veins strong beneath, flowers subsolitary sessile ebracteate, calyx-limb tubular truncate subentire, corolla pubescent.

ORISSA; Myhendra Mts., in Ganjam, alt. 4500 ft., *Beddome.*

Shrubby; branches black when dry. *Leaves* 5–6 by $\frac{3}{4}$–$1\frac{1}{4}$ in., grey-brown when dry, shining above, finely pubescent beneath; petiole $\frac{1}{10}$–$\frac{1}{6}$ in.; stipules $\frac{1}{6}$–$\frac{1}{4}$ in., triangular, acuminate, hirsute. *Flowers* often solitary, ebracteolate. *Calyx* glabrous, tube ovoid, limb narrowed upwards. *Corolla* $\frac{2}{3}$ in. long; tube slender, pubescent; lobes 5. *Drupes* not seen.

43. **L. strigosus,** *Wight in Calc. Journ. Nat. Hist.* vi. 512; young branches petioles and nerves beneath strigillose with appressed hairs, leaves shortly petioled elliptic-lanceolate acuminate shining above, base acute, nerves 7–9 pair, slender veins parallel branched and sparingly anastomosing, flowers few sessile, bracts 0 or minute, calyx-limb truncate, teeth 5 minute. Mephitidia strigosa, *Thw. Enum.* 146. M. varians, *Thw. l. c.* (C. P. 80, 1728).

CEYLON; Central Province and Saffragam district, alt. 2–5000 ft., *Walker*, &c.

Branches slender. *Leaves* 4–6 by 1–$1\frac{3}{4}$ in., rather coriaceous, brown when dry, nerves not very prominent beneath; petiole $\frac{1}{8}$–$\frac{1}{3}$ in.; stipules small, triangular, acute. *Flowers* in small fascicles. *Calyx* glabrous or strigose. *Corolla* white; tube $\frac{1}{4}$ in., glabrous or nearly so; throat villous, limb $\frac{1}{4}$ in. diam. *Drupe* $\frac{1}{6}$ in. ($\frac{1}{2}$ in. diam. when fruiting, *Thwaites*), subspherical, black, opaque; pyrenes 4–5.

VAR. *nitida*, Thwaites? *an species distincta*; leaves small $2\frac{1}{2}$–$3\frac{1}{2}$ in. narrowly lanceolate very coriaceous pale when dry shining on both surfaces, midrib beneath very stout, veins obscure.—Adam's Peak, *Thwaites* (C. P. 3910).—This is a very doubtful plant; I have seen no flowers or fruit.

VAR. *protracta*; leaves lanceolate finely acuminate 7–8 by $1\frac{1}{2}$–2 in., veins less branched straighter. Mephitidia protracta, *Thw. Enum.* 146.—Ceylon, Central Province, *Gardner.*

44. **L. andamanicus,** *Hook. f.*; branches petioles nerves beneath and flowers finely appressed pubescent, leaves petioled narrowly elliptic-oblong or lanceolate acuminate, base acute, nerves 9–10 pair, veins somewhat reticulate, flowers sessile clustered pubescent ebracteate, calyx-limb shortly tubular truncate. Rubiacea, *Wall. Cat.* 8309.

TENASSERIM; at Amherst, *Wallich.* ANDAMAN ISLANDS, *Helfer* (Kew Distrib. 2993), *Kurz.*

Branches almost black when dry. *Leaves* 6–8 by $\frac{3}{4}$–2 in., rather coriaceous and shining above, brown when dry; petiole $\frac{1}{4}$ in.; stipules small, $\frac{1}{8}$ in., triangular, pubescent. *Clusters* of flowers small. *Calyx-limb* enlarged, cupular, margin entire. *Corolla-tube* slender, $\frac{1}{3}$ in., and lobes villous without and within; limb $\frac{1}{3}$ in. diam. *Drupe* $\frac{1}{6}$ in., globose, obtusely angled, crowned by the large tubular calyx-limb, pubescent; pyrenes 4.

45. **L. Helferi,** *Hook. f.*; branches robust glabrous, leaves petioled narrowly oblong-lanceolate acuminate, base acute, nerves 10–12 pair finely pubescent

beneath, veins much reticulated, stipules coriaceous glabrous, flowers sessile clustered ebracteate glabrous, calyx-limb very shortly tubular truncate obscurely lobed.

TENASSERIM OT ANDAMAN ISLANDS, *Helfer* (Kew Distrib. 2921).

Branches black when dry, perfectly glabrous, as are all parts of the plant except the nerves beneath and inside of stipules. *Leaves* 4–6 by 1–$1\frac{1}{2}$ in., pale brownish when dry, shining above, hardly coriaceous; nerves and veins very slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules $\frac{1}{4}$ in., triangular-lanceolate, very coriaceous, glabrous without, hirsute within, pressed outwards and downwards by the enlarging ovaries, finally pale brown and polished. *Flowers* in small clusters. *Calyx* quite black when dry, limb coriaceous. *Corolla* not seen. *Drupe* $\frac{1}{6}$ in. diam., glabrous, subglobose, 6-lobed, areolate at the top, the shortly 5-lobed calyx-limb pressed flat on the crown; pyrenes 6.

SECT. IV. **Pedunculatæ.** *Cymes* peduncled (see also *S. L. Moonii*).

46. **L. longicauda,** *Hook. f.*; glabrous, leaves petioled lanceolate very long caudate-acuminate, base acute, nerves 8–10 pair very slender spreading hardly distinct from the veins, cymes or short peduncles few-flowered, bracts 0 or minute, calyx-teeth triangular. Mephitidia 18, *Herb. Ind. Or. H. f. & T.*

MISHMI HILLS (Upper Assam), *Griffith*; KHASIA MTS., alt. 5–7000 ft., *J. D. H. & T. T.*

A branching bush; branches slender, tips puberulous. *Leaves* 4–5 by $\frac{3}{4}$–$1\frac{1}{4}$ in., greenish when dry, opaque, tailed extremity one third of their length very slender (by far the most so of the genus), midrib strong, nerves looped; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules $\frac{1}{8}$ in., rusty-pubescent. *Peduncle* $\frac{1}{12}$–$\frac{1}{6}$ in., 3–8-flowered; flowers sessile, usually 4-merous. *Calyx* minute, puberulous. *Corolla* $\frac{1}{5}$ in., glabrous. *Drupe* $\frac{1}{6}$ in. diam., globose, blue, calyx-teeth inconspicuous; pyrenes 4.

47. **L. micranthus,** *Hook. f.*; young shoots petioles nerves beneath and cymes minutely strigose, leaves petioled ovate-lanceolate acuminate, base rounded membranous, nerves 5–6 pair, veins rarely branched, flowers very small sessile on a short peduncle ebracteate, calyx-teeth triangular-subulate.

MISHMI HILLS (Upper Assam), *Griffith.*

Branches slender, glabrous, pale. *Leaves* 4–6 by 1–$1\frac{1}{2}$ in., very pale greenish when dry; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules small, $\frac{1}{8}$–$\frac{1}{6}$ in., triangular strigose. *Peduncles* shorter than the petioles; flowers sessile. *Calyx* $\frac{1}{16}$ in.; teeth spreading, hirsute. *Corolla* and *Drupe* not seen.

48. **L. Biermanni,** *King mss.*; branches petioles cymes and nerves beneath minutely strigose, leaves petioled elliptic or elliptic-lanceolate cuspidate acuminate or caudate, base acute, nerves 5–7 pair, veins branched and reticulate, flowers sessile or pedicelled in short peduncles bracteolate, calyx-teeth ovate or lanceolate.

SIKKIM HIMALAYA, alt. 5–8000 ft., *Thomson*, &c.; KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

Branches slender, pale when dry. *Leaves* 5–7 by 1–2 in., greyish green when dry, rather membranous, opaque, sometimes pale beneath, tip sometimes 1–$1\frac{1}{2}$ in., and very slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules $\frac{1}{6}$ in., triangular, hairy. *Peduncles* equalling the petioles; flowers sessile and pedicelled; bracts small, linear or subulate. *Calyx* strigose. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., rosy or pale lilac, glabrous, throat and 5–6 lobes villous. *Drupe* $\frac{1}{4}$ in. diam., subgloboso, blue, crowned by the conniving calyx-teeth, glabrous; pyrenes 6, rugose on the back.—Some Sikkim specimens have very small corollas, $\frac{1}{6}$ in. long and pubescent, probably the flowers are dimorphic. The species approaches a Bornean one (*Beccari*, n. 3227).

49. **L. venulosus,** *Wight in Calc. Journ. Nat. Hist.* vi. 508; glabrous, leaves small petioled ovate oblong or elliptic acute acuminate or mucronate,

very coriaceous, base rounded, nerves 7–9 spreading, veins closely reticulated, flowers sessile or pedicelled and subracemose on a short stout peduncle, bracts subulate, calyx-teeth subulate. *Wight Ic.* t. 1032; *Bedd. Fl. Sylv. Anal. Gen.* t. xvii. f. 5. Santia venulosa, *W. & A. Prodr.* 422. Rubiacea, *Wall. Cat.* 8324, *in part* (*locality of Silhet erroneous*), 8459.

NILGHERRY MTS., alt. 6–8000 ft., common.

A very robust leafy much-branched shrub; branches black when dry. *Leaves* 1–3½ by ½–1 in., reddish-brown when dry, midrib and petiole (⅛–⅙ in.) very stout, nerves prominent on both surfaces; stipules small, ⅙ in., triangular or narrower. *Peduncles* longer than the petioles, pedicels hairy. *Calyx* hirsute, teeth 4–5, erect or recurved. *Corolla* ⅓ in., yellowish, glabrous without, throat and lobes within villous. *Drupe* ⅙ in. diam., blue, crowned by the calyx-teeth; pyrenes 3–5, thick-walled.

50. **L. capitulatus,** *Wight in Calc. Journ. Nat. Hist.* vi. 511; branches strigose pubescent or glabrate, leaves petioled lanceolate acuminate base acute coriaceous, nerves 7–9 pair, veins sparingly branched and reticulate, flowers sessile on a short peduncle bracteate, calyx-teeth small.

NILGHERRY MTS.; Sisparah, *Wight*; Conoor, alt. 7000 ft., *C. B. Clarke.*

A much larger and longer-leaved plant, with a narrower leaf-base than *L. venulosus*, not so stout, with less reticulated veins, the flowers capitate and corolla hirsute without; but my specimens are very incomplete. *Leaves* 4–6 by 1–1¼ in. in one of Wight's specimens, 4–5 by 1½–2¼ in. in another, which has the veins scarcely branched. *Peduncles* shorter than the petioles; bracts subulate; flowers pubescent. *Drupe* globose, ⅕ in. diam., crowned by the recurved calyx-teeth, smooth, glabrous; pyrenes 2–4, larger and much thinner-walled than in *L. venulosus.*

51. **L. dichotomus,** *Wight in Calc. Journ. Nat. Hist.* vi. 508; glabrous, leaves petioled oblong or ovate- rarely obovate-oblong base rounded or cordate, nerves 6–8 pair, veins very close-set straight, flowers sessile and on the branches of a slender peduncle, bracts subulate, calyx-teeth long lanceolate. *Bedd. Ic. Pl. Ind. Or.* t. 13.

TRAVANCORE; Shevagherry and Courtallam hills, *Wight, Beddome.*

Branches pale. *Leaves* 2–4 by ¾–1¾ in., pale brown when dry, rather thin, nerves strong, veins faint; petiole ⅛ in., sometimes strigose on the upper face; stipules small, $\frac{1}{10}$ in., lanceolate, acute, glabrous. *Cymes* including the very slender peduncle 1–1½ in., irregularly sparingly dichotomously branched; bracts $\frac{1}{16}$–⅛ in. long. *Calyx* ⅕ in. long, teeth 3–4, spreading tips hairy. *Corolla-tube* exceeding the calyx-teeth, at length glabrous, lobes hirsute within. *Ovary* 3–4-celled. *Drupe* not seen.

52. **L. varians,** *Thw. Enum.* 146 (Mephitidia), *partly*; quite glabrous, leaves small petioled shortly oblong apiculate base subacute or rounded, nerves 6–8 pair hardly distinguishable from the loosely reticulated veins, flowers few sessile or shortly pedicelled on the top of a rigid filiform peduncle, bracts subulate, calyx-teeth subulate.

CEYLON; Central Province, Galagama, alt. 5–8000 ft., *Thwaites.*

Branches slender, black when dry. *Leaves* 1½–2 by ¾–1¼ in., coriaceous, black-brown when dry, midrib excurrent as a firm point; petiole long and slender for the genus, ⅙–¼ in.; stipules very small, $\frac{1}{16}$ in., triangular. *Peduncles* very slender, strict, 1 in. and less, surmounted with a pair of subulate bracts $\frac{1}{16}$ in. long. *Calyx* glabrous, tube urceolate glabrous, longer than the subulate teeth. *Corolla* and *Drupe* not seen. *Ovary* 3-celled.—Thwaites includes under this species some states of *strigosus*, which differs in the inflorescence and calyx, as does its much nearer ally *L. Walkerianus*, which has a similar venation and excurrent midrib, and specimens of which are also included by Thwaites under *L. varians.*

DOUBTFUL SPECIES.

L. OBLIQUUS, *Thw. Enum.* 146 (Mephitidia oligantha, var. *β.* obliqua); branches slender with scattered strigose hairs, leaves subsessile ovate or oblong-lanceolate from a rounded or cordate oblique base caudate-acuminate membranous shining above, nerves 5–6 pair very slender hardly distinguishable from the laxly reticulating veins.—Ceylon; Saffragam district, up to 3000 ft., *Gardner, Thwaites.*—The broad leaves with rounded or cordate bases, and wide-spreading nerves of this plant, are so different from any of the many forms of the preceding described species, that I adopt Twaites' opinion of its being distinct.

MEPHITIDIA, sp., *Griff. Ic. Pl. Asiat.* t. 476, is probably a *Psychotria.*

80. **SAPROSMA,** *Blume.*

Shrubs, fœtid when bruised, with often subulate bristles at the tips of the branches and bases of the peduncles. *Leaves* opposite or 3–4 whorled, membranous; stipules interpetiolar, usually connate, 1–3-pointed, deciduous. *Flowers* small, white, axillary or terminal, solitary or fascicled, sessile or cymose and peduncled; bracts and bracteoles minute, often connate. *Calyx-tube* obconic; limb dilated, 4–6-lobed or -toothed, persistent. *Corolla* bell- or funnel-shaped, throat villous; lobes 4–5, broad, obtuse, valvate with inflexed flat or crisped margins. *Stamens* 4–5 in the corolla-throat, filaments short or 0; anthers linear or oblong. *Ovary* 2-celled; style filiform, arms 2 short; ovules 1 basal erect in each cell. *Drupe* small; pyrenes 1–2 crustaceous. *Seeds* ellipsoid and solitary or 2 and plano-convex, ventral face not grooved, testa membranous; cotyledons small foliaceous, radicle slender inferior.—DISTRIB. Species 8, tropical Asiatic and Malayan.

SECT. I. **Eusaprosma.** *Flowers* in small cymes. *Anthers* subsessile. *Seeds* ellipsoid, usually solitary.—*Leaves* opposite.

1. **S. indicum,** *Dalz. in Hook. Kew Journ.* iii. 37; glabrous, leaves sessile oblong or elliptic-oblong acuminate base narrowed or rounded, flowers few terminal, calyx-teeth minute triangular. *Dalz. & Gibs. Bomb. Fl.* 112. Dysodidendron glomeratum, *Gardn. in Calc. Journ. Nat. Hist.* vii. 3. S. glomeratum, *Bedd. Ic. Pl. Ind. Or.* t. 16.

WESTERN PENINSULA; on the Ghats from Bombay southwards, ascending to 4000 ft.

Branches pale, ultimate compressed. *Leaves* 3–5 by $\frac{3}{4}$–$1\frac{3}{4}$ in., thin.; stipules $\frac{1}{6}$ in., connate, often 3-cuspidate. *Flowers* shortly pedicelled, with a basal toothed calyculus. *Calyx* unequally 4–5-toothed. *Corolla* $\frac{1}{4}$ in. long, white. *Style* shortly 2-fid. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in., ellipsoid. *Seed* solitary, broadly ellipsoid or globose.

VAR. *Gardneri*; leaves usually broadly ovate-cordate. Serissa Gardneri, *Thw. Enum.* 150.—Ceylon; forests about Galagama, *Thwaites.*

2. **S. consimile,** *Kurz For. Fl.* ii. 29; glabrous, leaves petioled or sessile elliptic or lanceolate acuminate or caudate, base acute, flowers solitary or few terminal, calyx-teeth lanceolate. Psychotria, *Wall. Cat.* 8351. Coffea, *Wall. Cat.* 8450. Rubiacea, *Wall. Cat.* 8467.

KHASIA MTS., *De Silva*; MARTABAN and TENASSERIM, in dry hill forests, alt. 3–5000 ft., *Falconer, Kurz.*

Branches pale, ultimate minutely strigose or glabrate, not compressed. *Leaves* 3–5 by $\frac{1}{2}$–$1\frac{1}{2}$ in., membranous, pale greenish when dry; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules connate, mouth bristly. *Flowers* sessile and shortly pedicelled, pedicels with basal bristles. *Calyx-tube* funnel-shaped; lobes lanceolate, spreading. *Corolla* $\frac{1}{4}$ in. long. *Style* subentire. *Fruit* "broadly obovoid, smooth, and seed usually solitary," *Kurz.*—Some of the Tenasserim specimens have quite sessile leaves and look different, but, having no flowers, it is impossible to say whether they are so specifically.

3. **S. fragrans,** *Bedd. Fl. Sylv., For. Man.* 134/11; glabrous, leaves shortly petioled elliptic obtusely acuminate, flowers in small axillary and terminal cymes, calyx-teeth broadly triangular. Serissa fragrans, *Bedd. Ic. Pl. Ind. Or.* t. 14.

NILGHERRY MTS., on the western slope; and TINNEVELLY HILLS, alt. 2000 ft., *Beddome.*

"Fœtid when crushed" (*Bedd.*). *Branches* smooth, ultimate compressed. *Leaves* 3–4 by $1\frac{1}{2}$–2 in., green when dry, membranous; petiole $\frac{1}{12}$–$\frac{1}{10}$ in.; stipules entire or toothed. *Cymes* small, rarely $\frac{1}{2}$ in. long, few-flowered, trichotomous; bracts minute. *Flowers* very odorous. *Calyx* cupular. *Corolla* $\frac{1}{4}$ in. *Style-arms* 2 linear, short. *Fruit* ellipsoid, 1-seeded.

4. **S. scabridum,** *Bedd. Fl. Sylv., For. Man.* 134/12; branches scabrid, leaves long-petioled elliptic acuminate, base acute, petiole and midrib scabrid, flowers terminal sessile, calyx hairy, teeth 4 linear-lanceolate. Serissa scabrida. *Thw. Enum.* 151.

CEYLON; near Ratnapoora, *Thwaites.*

Leaves 2–3 by $\frac{3}{4}$–$1\frac{1}{4}$ in.; petiole $\frac{1}{4}$ in.; stipules connate, scabrid, aristate-fimbriate. —This I have not seen. The character is taken from Thwaites, who had but one specimen, without flowers or ripe fruit.

SECT. II. **Dysodidendron.** *Peduncles* 1–3-flowered. *Anthers* with filaments. *Seeds* usually 2, plano-convex. *Leaves* opposite.

5. **S. ceylanicum,** *Bedd. Fl. Sylv., For. Man.* 134/12; glabrous, leaves shortly petioled elliptic or lanceolate acuminate, peduncles axillary and terminal 1–3-flowered slender, calyx-teeth 4 triangular. Dysodidendron ceylanicum and Wightii, *Gardn. in Calc. Journ. Nat. Hist.* vii. 2, 3. Serissa ceylanica, *Thw. Enum.* 150. S. Wightii, *Bedd. Ic. Pl. Ind. Or.* t. 15. Lasianthus fœtens, *Wight in Calc. Journ. Nat. Hist.* vi. 517.

WESTERN PENINSULA; on the Ghats, alt. 3–6000 ft., from Malabar southwards in moist woods, *Wight*, &c. CEYLON; in forests of the central province, alt. 3–6000 ft., *Walker*, &c.

A shrub or small tree, fœtid when bruised; branches pale, smooth, ultimate compressed. *Leaves* 4–5 by $\frac{3}{4}$–2 in., sometimes oblanceolate, green when dry, membranous; petiole $\frac{1}{10}$–$\frac{1}{4}$ in.; stipules connate, toothed. *Peduncles* $\frac{1}{2}$–$1\frac{1}{2}$ in.; bracts and bracteoles minute. *Calyx-tube* obconic, glabrous. *Corolla* $\frac{1}{2}$ in., purple. *Style-arms* 2, short, linear. *Fruit* $\frac{1}{3}$ in., obovoid, obtuse, "bright blue, very fœtid" (*Bedd.*). *Seeds* plano-convex.

SECT. III. **Triadicla.** *Flowers* in corymbose cymes. *Anthers* subsessile. *Seeds* ellipsoid. *Leaves* often 3–4-nately whorled.

6. **S. ternatum,** *Hook. f. in Gen. Pl.* ii. 131; glabrous, leaves 3-nately whorled petioled elliptic or lanceolate acuminate, cymes axillary solitary or fascicled, flowers corymbose, calyx-teeth 4–6 triangular. *Kurz For. Fl.* ii. 29. Pæderia ternata, *Wall. Cat.* 6248, and in *Roxb. Fl. Ind., ed. Carey & Wall.* ii. 520; *DC. Prodr.* iv. 471. Serissa ternata, *Kurz Andam. Rep. App.* A. 40. Mephitidia, sp., *Griff. Notul.* iv. 267; *Ic. Pl. Asiat.* t. 476.

EASTERN HIMALAYA; Mishmi and Bhotan mts., *Griffith.* KHASIA MTS., alt. 2–3000 ft., *De Silva*, &c. BURMA, *Griffith.* ANDAMAN ISLANDS, *Kurz.*

Branches pale or dark, smooth, rather stout, ultimate angled. *Leaves* 4–10 by $1\text{–}3\frac{1}{2}$ in., rather coriaceous, greenish when dry, midrib and petiole ($\frac{1}{4}$ in.) sometimes scaberulous; veins often straight and parallel, as in *Lasianthus*; stipules $\frac{1}{3}$ in., lanceolate with needle-like points, glabrous or pubescent. *Peduncles* $\frac{1}{2}$–$1\frac{1}{4}$ in., with bristles at its base, bracts and bracteoles small lanceolate; pedicels $\frac{1}{4}$ in. *Calyx* glabrous, shortly campanulate. *Corolla* $\frac{1}{3}$ in., pubescent, white. *Style-arms* 2, linear. *Fruit*

ellipsoid, $\frac{1}{3}$ by $\frac{1}{4}$ in., smooth, crowned by the conical disk, which is girt at its base by the very short calyx-limb.—Kurz distinguishes the Andaman form as var. *puberula*, with the petioles, stipules, nerves beneath, pubescent.

7. **S. corymbosum,** *Bedd. Fl. Sylv., For. Man.* 134/12; glabrous, leaves opposite and 3–4-nately whorled, petioled elliptic acute or acuminate, cymes axillary and terminal trichotomously paniculately branched, calyx-teeth 4 minute. Serissa corymbosa, *Bedd. Ic. Pl. Ind. Or.* t. 17.

TINNEVELLY HILLS, south of Courtallam, alt. 3–4000 ft., *Beddome.*

Branches pale or dark, smooth, 4-gonous. *Leaves* 4–8 by 1–2$\frac{1}{2}$ in., dull greenish when dry, veins reticulate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules not seen. *Peduncles* slender, $\frac{1}{4}$–1 in., bristles at their base very short; cyme-branches opposite or whorled, slender, horizontal; bracts and bracteoles minute. *Calyx* shortly obconic, glabrous. *Corolla* $\frac{1}{4}$ in., papillose, margins of lobes hardly induplicate. *Anthers* exserted. *Style-arms* 2, flattened. *Fruit* unknown.

81. HYDNOPHYTUM, *Jack.*

Epiphytic glabrous shrubs, with a deformed fleshy tuberous simple or lobed stock, excavated by ants; branches square. *Leaves* opposite, leathery, obtuse; stipules interpetiolar, deciduous. *Flowers* small, axillary, solitary or fascicled, sessile, white. *Calyx-tube* ovoid, limb obscure. *Corolla* funnel- or salver-shaped, tube long or short; lobes 4, short, valvate. *Anthers* 4, subsessile on the corolla-throat, oblong. *Ovary* 2-celled; style-arms narrow or broad; ovules 1, basal, erect in each cell. *Drupe* small; pyrenes 2, plano-convex. *Seeds* oblong; testa thin with black lines; embryo?—DISTRIB. 3 or 4 species, Malayan, N. Australian, and Fijian.

1. **H. formicarium,** *Jack in Trans. Linn. Soc.* xiv. 124; leaves obovate oblong or elliptic, tip rounded. *Blume Bijd.* 956; *DC. Prodr.* iv. 451; *Kurz For. Fl.* ii. 8. H. montanum, *Blume DC. ll. cc.* Lasiostoma formicarium, *Spreng. Syst.* i. 423.—*Rumph. Herb. Amb.* vi. t. 55, f. 1.

SOUTH ANDAMAN ISLAND, *Kurz.* MALACCA; Pulo Bissar, *Griffith* (Kew Distrib. 2975), *Maingay* (864).—DISTRIB. Sumatra, Java, Borneo.

Tuberous stock 6–14 in., smooth, rooting from its under surface; branches few, simple, or sparingly divided, stout. *Leaves* 3–4 by 1–2 in., pale brown when dry, coriaceous, nerves obscure, narrowed into the very short stout petiole. *Flowers* few. *Corolla-tube* $\frac{1}{12}$ in., glabrous without; lobes oblong, acute. *Fruit* oblong, crowned by the crateriform calyx-limb, smooth, glossy, orange crimson.—The specimens I have seen are very insufficient as to flowers and fruit, the characters of which are in part borrowed from Kurz.

82. MYRMECODIA, *Jack.*

Characters (as far as known) of *Hydnophytum*, but fruit with 4–5 pyrenes. —DISTRIB. Species 2, Malayan and N. Australian.

1. **M. armata,** *DC. Prodr.* 450?; leaves petioled elliptic or cuneate-oblong, spinules in vertical series on the stock. ? M. tuberosa, *Blume Bijd.* 1101. ? M. echinata, *Gaud. in Freyc. Voy. Bot.* t. 96.

SINGAPORE, *A. Wallace.*—DISTRIB. Malay Archipelago, N. Australia?

This is a very little known plant, of which my only materials are tubers and seeds sent by Mr. Wallace in 1855, with an excellent sketch containing some analyses. The sketch represents a nearly globose tuber, 2$\frac{1}{2}$ in. diam., excavated by ants, depressed at the top, irregularly grooved, studded with spinules irregularly disposed in longitudinal lines. Short thick simple curved branches, 4–5 in., proceed from a very short stock on the crown of the tuber; these are covered throughout their length with ovoid

patches of apparently close-set spinules (or bracts?), amongst which the flowers nestle. *Leaves* irregularly scattered, 3 by 1 in., elliptic, subacute, narrowed into a petiole ½–1 in.; stipules not represented. *Calyx* not represented. *Corolla* funnel-shaped, inflated below, 4 erect recurved triangular acute teeth, glabrous without; tube with a ring of hairs within below the stamens. *Stamens* 4, on the corolla-throat; filaments very short; anthers broadly oblong. *Style* stout; stigmas 6, or 3 each 2-fid, erect. *Fruit* crowned with the calyx-limb, narrowly obovoid, "smooth, yellow, gooseberry-like," *Wallace*; pyrenes 5; these I have examined; they are narrowly oblong, coriaceous, and contain 1 erect seed with a membranous testa, fleshy albumen, and cylindric embryo ⅔ the length of the seed, cotyledons small, radicle elongate inferior.—Whether this is De Candolle's or Blume's or Gaudichaud's plant is doubtful; the latter has intrapetiolar 2-fid stipules connate at the base. Both this and *Myrmecodia* present a most interesting study, both in respect of their growth and structure and of their relation to the ants which inhabit them. Good specimens preserved in spirits are much wanted.

TRIBE XIV. **PÆDERIEÆ.**

83. **PÆDERIA,** *Linn.*

Slender twining shrubs, fœtid when bruised; branches terete, flexuous. *Leaves* opposite, rarely whorled in threes, petioled; stipules intrapetiolar, triangular, deciduous. *Flowers* in axillary and terminal 2–3-chotomously branched panicled cymes, bracteolate or not. *Calyx-tube* ovoid or turbinate; limb 4–5-toothed, persistent. *Corolla* tubular or funnel-shaped, pubescent, throat glabrous or villous; lobes 4–5, valvate with inflexed crisped margins, tip often 3-lobed. *Anthers* 4–5, subsessile in the corolla-tube, linear-oblong, obtuse. *Ovary* 2-celled; stigmas 2, capillary, twisted; ovules 1, basal, erect in each cell. *Fruit* globose or compressed; epicarp thin, fragile, shining, separating from 2 orbicular or oblong dorsally compressed membranous or coriaceous pyrenes. *Seeds* much dorsally compressed, testa thin adnate to the pyrene; cotyledons large cordate thin, radicle short inferior.—DISTRIB. Species 9 or 10, in tropical Asia and 1 in Brazil.

* *Fruit much compressed; pyrenes separating from a filiform carpophore, more or less winged.*

1. **P. fœtida,** *Linn.*; *Roxb. Fl. Ind.* i. 683; glabrous or nearly so, leaves opposite long-petioled ovate or lanceolate, base acute rounded or cordate, cyme-branches opposite, calyx-teeth short triangular, fruit broadly elliptic compressed, pyrenes black with a broad pale wing. *Wall. Cat.* 6247, *excl.* E.; *W. & A. Prodr.* 424; *DC. Prodr.* iv. 471; *Griff. Notul.* iv. 267; *Ic. Pl. Asiat.* t. 479, f. 3; *Kurz in Journ. As. Soc.* 1877, ii. 139; *For. Fl.* ii. 26. P. ovata, *Miq. in Ann. Mus. Lugd. Bat.* iv. 255. P. sessiliflora, *DC. Prodr.* 472.

From the CENTRAL and EASTERN HIMALAYA, ascending to 5000 ft., southward to MALACCA and westward to Calcutta.—DISTRIB. Malay Archipelago to Borneo (Mauritius introduced?).

Leaves 2–6 by ¾–2½ in.; petiole ½–1 in. *Panicle* 2–6 in. long, puberulous; branches long in distant pairs, cymose at the extremity; bracts minute, ovate or subulate, ciliolate; flowers sessile and pedicelled. *Calyx* small, tube campanulate. *Corolla* ½–⅔ in., tomentose. *Fruit* ¼–⅓ in., polished, crowned by the conical disk and minute calyx-teeth.

VAR. *microcarpa*, Kurz in Journ. As. Soc. l. c.; panicles very slender, flowers more numerous, calyx minute, fruit orbicular ¼ in. diam.—Ava at Taongdong, *Wall. Cat.* 6247.

2. **P. verticillata,** *Blume Bijd.* 968; glabrous, leaves opposite and 3-

nately whorled petioled broadly oblong upper lanceolate acuminate, cyme-branches whorled, calyx-limb truncate, corolla glabrous. *DC. Prodr.* iv. 471.

MALACCA, *Maingay* (Kew Distrib. 885).

Very similar to *P. fœtida*, except in the characters indicated, and the much narrower panicles with short ($\frac{1}{4}$–$\frac{1}{3}$ in.) stouter branches.

3. **P. calycina,** *Kurz in Journ. As. Soc.* 1873, ii. 74; *For. Fl.* ii. 76; leaves opposite long-petioled cordate-ovate or -lanceolate acuminate hispidulous especially beneath, calyx-lobes lanceolate subfoliaceous, fruit broadly ellipsoid compressed, pyrenes with a very narrow black thickened margin. P. fœtida, *Wall. Cat.* 6247 E.

TENASSERIM; at Tavoy, *Wallich.*

Branches glabrous. *Leaves* 4–5 by $1\frac{3}{4}$–2 in., very membranous, deeply cordate with the sinus open and lobes incurved; petiole 1–2 in., hispidulous. *Flowers* not seen. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in., shining, about twice as long as the stellately spreading calyx-lobes.—Wallich's specimens are the only ones I have seen.

4. **P. lanuginosa,** *Wall. Pl. As. Rar.* ii. 52, t. 165 (*not Wall. Cat.* 7293); petioles and panicles scurfily tomentose, leaves opposite long-petioled all broadly ovate-cordate acuminate scaberulous above woolly beneath, panicle with the branches short stout, fruit large compressed ellipsoid with erect calyx-teeth, pyrenes black with a broad pale wing. P. macrocarpa, *Wall. Cat.* 7292; *G. Don Gen. Syst.* iii. 561.

RANGOON; at Pegu, *Wallich.* MARTABAN; at Moulmein, *Parish.*

Leaves 4–6 by $2\frac{1}{2}$–$4\frac{1}{2}$ in., rather coriaceous, dull greenish when dry above, buff beneath, the upper not narrower; petiole 2–4 in. *Panicles* elongate; branches $\frac{1}{4}$–$\frac{1}{2}$ in., opposite; bracts subulate or triangular-lanceolate. *Corolla* $\frac{3}{4}$ in. long, pink, woolly within. *Fruit* $\frac{3}{4}$ in. long, pale-brown, puberulous, the very short obtuse teeth erect and girding the base of the conical disk.

5. **P. Wallichii,** *Hook. f.*; petioles and panicles finely pubescent, leaves opposite petioled ovate-cordate the upper much narrower scabrid above woolly beneath, panicles with slender branches, flowers subcapitate, fruit small broadly ellipsoid compressed with broadly triangular reflexed calyx-teeth. P. lanuginosa, *Wall. Cat.* 7293, *in part* (*not of Pl. As. Rar.*); *Kurz For. Fl.* ii. 76.

TENASSERIM; Atran river, near the hot wells, *Wallich, Helfer.*

Leaves 5–6 by $2\frac{1}{2}$–3 in., dull green above when dry, buff beneath, rigid, and clothed with short rigid hairs, base deeply cordate with incurved lobes, upper not half the breadth of the lower; petiole stout, 1–$1\frac{1}{2}$ in. *Panicles* long, slender, branches and flowers pubescent and with short spreading hairs; flowers in small heads about $\frac{1}{2}$ in. diam. *Corolla* $\frac{1}{3}$ in. *Fruit* (young) broadly ellipsoid, nearly orbicular, $\frac{1}{4}$ in. diam.—I suspect that Kurz's *P. lanuginosa* includes this and the true plant; he describes the leaves as sometimes ovate-lanceolate, which is not the case in Wallich's *lanuginosa* (*macrocarpa* of his Cat.), and states that it is common in mixed forests from Burma to Tenasserim.

6. **P. pilifera,** *Hook. f.*; branches petioles and panicles clothed with long spreading hairs, leaves opposite subhastately-lanceolate acuminate scaberulous above woolly beneath, calyx-teeth triangular-lanceolate, fruit orbicular compressed, pyrenes black with a broad pale wing. *Wall. Cat.* 7293, *in part.*

TENASSERIM; Atran river, *Wallich.*

Habit of *P. lanuginosa*, but differing widely in the long spreading hairs that clothe those parts which in that plant present a close short soft pubescence. *Fruit* $\frac{1}{4}$ in. diam., pale, shining, the broad short calyx-teeth sharply reflexed.

** *Fruit subglobose, pyrenes not separating from a filiform carpophore.*

7. **P. tomentosa,** *Blume Bijd.* 968; glabrous or sparsely pubescent, leaves opposite petioled ovate or lanceolate acute or acuminate, base rounded or cordate, calyx-teeth very short, fruit subglobose, pyrenes not winged. *DC. Prodr.* iv. 471; *Kurz For. Fl.* ii. 76. P. barbulata, *Miq. in Ann. Mus. Lugd. Bat.* 255. P. fœtida, *Benth. Fl. Hongk.* 162. Pæderia sp., *Griff. Notul.* iv. 268; *Ic. Pl. Asiat.* t. 479, f. 4.

From the EASTERN HIMALAYA and KHASIA MTS., ascending to 6000 ft. to SINGAPORE.—DISTRIB. Malay Islands, S. China, Japan.

Leaves 2–4 by 1–2½ in., above glabrous or sparsely hairy, beneath glabrous pubescent or subtomentose; petiole 1–3 in. *Panicle* as in *P. fœtida*, but branches usually shorter and the ultimate often scorpioid with secund sessile flowers. *Calyx* and *corolla* as in *P. fœtida*. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., with 2 orbicular much compressed pyrenes.

?8. **P. linearis,** *Hook. f.*; glabrous, very slender, leaves opposite subsessile narrowly linear acute, calyx-teeth minute, corolla pubescent.

TENASSERIM; at Mergui, *Griffith* (Kew Distrib. 2911).

Branches shining. *Leaves* 2–3 by $\frac{1}{6}$ in., nerves very obscure; petiole $\frac{1}{8}$ in. or less. *Panicles* spreading, broad; branches very slender, repeatedly trichotomous; bracteoles minute, flowers remote, often on long pedicels, like those of *P. fœtida*. *Fruit* (unripe) subglobose, glabrous, $\frac{1}{6}$ in. diam.—This is probably allied in the fruit to *P. tomentosa.*

EXCLUDED SPECIES.

P. RECURVA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 684; *DC. Prodr.* iv. 471, appears from Roxburgh's drawing to be *Ixora recurva*, Kurz.

P. ERECTA, *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 685; *DC. Prodr.* iv. 471, is probably a *Psychotria.*

84. HAMILTONIA, *Roxb.*

A hispid pubescent or glabrate erect 3-chotomously branched undershrub, fœtid when bruised, branches terete. *Leaves* opposite, petioled, nerves many, stout; stipules intrapetiolar, short, acute, persistent. *Flowers* small, in broad terminal 3-chotomously branched panicled or subumbellate cymes, white or blue, sweet-scented, bracteate and bracteolate. *Calyx-tube* ovoid; limb of 4–5 subulate persistent segments. *Corolla* funnel-shaped, tube long; lobes 4–5, short, valvate. *Stamens* 5, inserted in the corolla-throat, filaments short subulate; anthers obovate-oblong, obtuse. *Ovary* 5-furrowed, outer coat almost free from the 5-celled inner coat; style filiform, arms 5 linear; ovules 1, basal, erect in each cell. *Capsule* 1-celled from the absorption of the septa, 5-valved at the top, 5 (or fewer-) -seeded. *Seeds* 3-quetrous, outer coat of testa reticulate 3-valved at the base, inner thick; cotyledons cordate induplicate, radicle inferior.

1. **H. suaveolens,** *Roxb. Hort. Beng.* 15; *Fl. Ind.* i. 554; *DC. Prodr.* iv. 462; *Brand. For. Fl.* 278; *Bedd. Fl. Sylv. Anal. Gen.* 134/12, t. 17, f. 3. H. scabra, *Don Prodr.* 137; *DC. l. c.* H. mysorensis, *W. & A. Prodr.* 423; *Dalz. & Gibs. Bomb. Fl.* 115. H. propinqua, *Dcne. in Jacq. Voy. Bot.* t. 91. Lasianthus tubiflorus, *Blume Bijd.* 999. Spermadictyon suaveolens, *Roxb. Cor. Pl.* t. 236; *Wall. Cat.* 6239; *Bot. Reg.* t. 348. S. azureum, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 225; *Cat.* 6240; *Bot. Reg.* t. 1235.

TROPICAL and SUBTROPICAL HIMALAYA and the Salt Range, alt. 2–5000 ft., from Kashmir to Bhotan. CENTRAL INDIA and the WESTERN PENINSULA, ascending to 4000 ft. from Marwar and Behar southwards to Mysore on dry rocky hills.—DISTRIB. China (probably introduced).

An undershrub 4–12 ft. high, with spreading branches. *Leaves* rather rigid, 6–12 by 2–4 in., elliptic-lanceolate or ovate, acute, glabrous or pubescent, base acute; petiole $\frac{1}{2}$–1 in. *Flowers* in subglobose heads, most copiously produced in terminal trichotomous pubescent panicles, fragrant, white or blue, sessile or pedicelled; bracts subulate. *Calyx-teeth* very variable in shape, longer than the ovary, glabrous pubescent or hairy, with often interposed gland-tipped processes. *Corolla-tube* $\frac{1}{2}$ in., pubescent or woolly. *Stamens* and *style* more or less exserted according to sex. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., ellipsoid. Bhotan specimens have very short broad calyx-teeth.

85. LEPTODERMIS, *Wall.*

Shrubs, fœtid when bruised; branches terete. *Leaves* opposite, the pairs often fascicled; stipules small, acute or pungent, persistent. *Flowers* bracteate and bracteolate, 3-nate or in terminal fascicles, white or purplish, subsessile; bracteoles connate into a 2-cuspidate scarious tube. *Calyx-tube* obconic, lobes 5 (4–6), coriaceous, persistent. *Corolla* funnel-shaped, tube slender, hairy within; throat glabrous; lobes 5 (4–6), valvate with inflexed edges. *Stamens* 5 (4–6), inserted in the corolla-throat, filaments short; anthers linear-oblong, ♂ exserted, ♀ included effete. *Ovary* 5-celled; style filiform, arms 5 linear ♀ exserted; ovules 1, basal, erect in each cell. *Capsule* cylindric or ovoid, 5-valved to the base, apex deciduous between the hardened persistent calyx-teeth, valves separating from 3–5 erect free fibrous pyrenes, the fibres simple or reticulating, loose or appressed. *Seeds* erect, testa membranous; cotyledons orbicular, radicle short slender inferior.—DISTRIB. Species 5 or 6, a Chinese, and the following.

1. **L. lanceolata,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* ii. 191; *Cat.* 6241; leaves ovate elliptic or elliptic-lanceolate puberulous or hispid above, stipules small acute appressed, capsule cylindric. *DC. Prodr.* iv. 462; *Dcne. in Jacq. Voy. Bot.* t. 90; *Brand. For. Fl.* 279. Hamiltonia suaveolens, *Don Prodr.* 137.

TEMPERATE HIMALAYA, alt. 4–10,500 ft., from Kashmir to Bhotan, *Wallich*, &c.

A rigid erect shrub; branches glabrous, scabrid or hispid. *Leaves* very variable, $\frac{1}{2}$–4 by $\frac{1}{4}$–$1\frac{1}{2}$ in., more or less hairy beneath, rigid or rather membranous; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Flowers* subcapitate, terminal, and on short lateral branches, white, 4–6-merous. *Bracts* tubular, glabrous or puberulous. *Calyx-teeth* triangular, acute. *Corolla* $\frac{1}{3}$ in. long, glabrous or hairy. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., cylindric, truncate, crowned by the persistent ciliate calyx-teeth; fibrous utricle enclosing the seed long and very lax.

2. **L. virgata,** *Edgew. in Aitchison Cat. Punjab. Pl.* 70; leaves very small linear or oblong acute scabrid above, stipules with long pungent recurved points, capsule cylindric.

WESTERN HIMALAYA, alt. 4–7000 ft. from Murree, *Falconer* to Kulu, *Edgeworth*. SALT RANGE, *Fleming*.

A slender rigid excessively branched shrub; branches very slender, erect or divaricate, white with spreading pubescence. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{8}$ in., fascicled, straight or somewhat falcate, margins flat or recurved, pale beneath, nerves obscure; stipules triangular with rigid long pungent points and thickened margins, white. *Bracts* often equalling the capsule. *Calyx* glabrous, teeth lanceolate ciliate, much larger than in *L. lanceolata*. *Corolla* $\frac{1}{3}$ in. long, pubescent, purplish. *Capsule* $\frac{1}{8}$ in., subcylindric. *Seed* with a few free fibres attached to the integument.

3. **L. Griffithii,** *Hook. f.*; leaves elliptic-lanceolate acute narrowed into the petiole smooth or scabrid above, stipules small appressed, capsule ovoid twice as long as the bracteoles and as the lanceolate glabrous calyx-teeth.

KHASIA MTS., alt. 3–5000 ft., *Griffith* (Kew Distrib. 2964), &c.

A small rigid bush; branches stout; branchlets slender, furfuraceous. *Leaves* ½–1½ in., brown when dry, nerves 2–3 pair, glabrous or nearly so beneath. *Calyx-teeth* nearly glabrous, lanceolate. *Corolla* white, ⅓ in. long. *Capsule* ⅙ in. long, brown. *Seed* enclosed in an adnate reticulate fibrous coat.

4. **L. scabrida,** *Hook. f.*; leaves small elliptic-lanceolate subacute scabrid above coriaceous, stipules with recurved pungent points, capsules ovoid twice as long as the bracteoles, much longer than the short obtuse glabrous calyx-teeth.

MISHMI HILLS (Upper Assam), towards the summit of Thumathya, *Griffith.*

Evidently nearly allied to *L. Griffithii*, having a turgid capsule. but this and the leaves are smaller, the calyx-teeth shorter and more obtuse, and the utricle quite loose. "Corolla tinged with purple," *Griffith. Seeds* enclosed in a loose reticulate fibrous coat.

IMPERFECTLY KNOWN SPECIES.

L. sp.?; an excessively branched shrub, branches slender hispid interlaced, leaves ¾–1 in. linear or linear-lanceolate acute hispid above or on both surfaces, stipules small appressed, bracteoles short pubescent, capsules cylindric ⅛ in. long, calyx-teeth very short.—Nipal, *Wallich* (*Cat.* 6241 A., *in part*).—Habit of *L. virgata*, Edgw.

L. sp.?; branches stout, leaves ½ in. elliptic or ovate obtuse hirsute on both surfaces, stipules small appressed, capsules cylindric ¼ in., calyx-teeth broad short.—Bhotan near Telagoung, *Griffith.*—Specimens of an allied species or variety from below Chupcha, 7000 ft., *Griffith*, have very slender branches and obovate or oblong leaves ⅛–⅓ in.

TRIBE XV. SPERMACOCEÆ.

86. HYDROPHYLAX, *Linn. fil.*

Creeping glabrous stout succulent herbs, branches terete. *Leaves* opposite, sessile, ovate-oblong; stipules combined with the petioles into an entire or toothed cup. *Flowers* solitary, axillary, shortly pedicelled, lilac. *Calyx-tube* 4-angled; segments of limb ovate-lanceolate, persistent. *Corolla* rather fleshy, between bell- and funnel-shaped, tube with a ring of hairs within; lobes 4, ovate, valvate. *Stamens* 4 on the corolla-throat, filaments filiform; anthers linear. *Ovary* 2-celled; style filiform, pubescent, stigma obscurely 2-lobed; ovules 1, peltately attached to the septum in each cell. *Fruit* large, corky, oblong-ovoid, compressed, curved, acutely 3–4-keeled between the acute margins, 1–2-celled, 2-seeded.—DISTRIB. An Asiatic, a Natal, and a Madagascar species.

1. **H. maritima,** *Linn. f.*; leaves obovate acute. *Roxb. Cor. Pl.* t. 233; *Fl. Ind.* i. 373; *DC. Prodr.* iv. 576; *Wall. Cat.* 6205; *W. & A. Prodr.* 441; *Wt. Ic.* t. 760. Sarissus anceps, *Gaertn. Fruct.* i. 118, t. 25.

Sand-hills on the shores of the WESTERN PENINSULA and CEYLON.

Stems a foot long, sparingly branched. *Leaves* ½–1 by ¼–½ in., often recurved, sometimes papillose or subscabrid, stipules broad sheathing. *Calyx-tube* ¼ in., longer than the lobes. *Corolla* ⅓–½ in. long, and as broad across the lobes. *Fruit* ½–⅔ in. long, crowned with the enlarged calyx-teeth.

87. SPERMACOCE, *Linn.*

Herbs or low undershrubs; branches usually square. *Leaves* opposite; stipules connate with the petioles into a broad truncate tube with marginal bristles. *Flowers* small or minute, solitary or in axillary or terminal fascicles heads or cymes. *Calyx-tube* various, limb of 2–4 (rarely 5) teeth with often interposed teeth or bristles. *Corolla* funnel- or salver-shaped; lobes 4, valvate.

Stamens 4, on the throat or tube of the corolla, filaments short or long; anthers linear or oblong. *Ovary* 2-celled; style filiform with 2 short arms or a capitate stigma; ovules 1 in each cell, on the middle of the septum, amphitropus. *Fruit* of 2 coriaceous or crustaceous mericarps which dehisce variously. *Seeds* oblong, grooved ventrally, testa thin often granulate; cotyledons thin, broad; radicle inferior.—DISTRIB. Species about 150, tropical and subtropical.

* *Capsule dehiscing septicidally, both mericarps then dehiscing ventrally.*

1. **S. stricta,** *Linn. f.*; *DC. Prodr.* iv. 554; annual, stem usually erect and leaves more or less scabrid, leaves from linear to ovate acute, calyx hispid or pubescent, teeth slender, seeds linear-oblong highly polished. *Roxb. Fl. Ind.* i. 370; *Kurz in Journ. As. Soc.* 1877, ii. 137. S. lasiocarpa, *Br. in Wall. Cat.* 832. S. pusilla, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 379; *Cat.* 823; *Don Prodr.* 134. S. filina, Gardneri, and angustifolia, *Wall. Cat.* 830, 834, 835. S. triandra, *Ham. in Don Prodr. l. c.* Bigelovia stricta, *Blume Bijd.* 945. B. lasiocarpa, Roxburghiana, and Kleinii, *W. & A. Prodr.* 437. B. myriantha, *Miq. Fl. Ind. Bat.* ii. 334. Borreria pusilla, *DC. l. c.* 543. B. gracilis, *Miq. in Pl. Hohen.* No. 705.

TROPICAL HIMALAYA from Kashmir eastwards, ascending to 5500 ft., and throughout India to SINGAPORE and CEYLON.—DISTRIB. Tropical Asia and Africa.

Stem 6–14 in., simple or branched from the base, angles more or less scabrid. *Leaves* subsessile, 1–2 by $\frac{1}{6}$–$\frac{1}{2}$ in., green when dry, narrowed at both ends, horizontal or deflexed, more or less coriaceous, glabrous or with scabrid nerves beneath. *Heads* globose, usually very many- and dense-flowered; bracteoles filiform, exceeding the calyx. *Corolla* $\frac{1}{8}$ in. long, white. *Stigma* subglobose. *Capsule* narrowed at the base, glabrous below, rather membranous.—The two most prominent forms of this variable plant are small fruited ones with globose heads and very narrow leaves, the *S. pusilla*, DC., and *B. myriantha*, Miq., and a large coarser plant, *S. lasiocarpa*, Br., but there are no limits between these forms.

2. **S. ocymoides,** *Burm. Fl. Ind.* 34, t. 13, f. 1; perennial, glabrous or nearly so, stems branched from the base decumbent and ascending, leaves ovate elliptic or lanceolate acute glabrous or scabrid above, calyx glabrous or glabrate, teeth lanceolate, seeds oblong black granulate opaque. S. stricta, *Schlecht. in Pl. Hohen.* No. 998. S. ramosa, tenera, ocymoides, and Roxburghiana, *Wall. Cat.* 831, 833, 6185, 6186 *excl.* B. Borreria ocymoides, *DC. Prodr.* iv. 544. Bigelowia Roxburghiana, *Wight Cat.* 1360 (*not of W. & A. Prodr.*). B. lævicaulis and setidens, *Miq. Fl. Ind. Bat.* ii. 334, 336.

WESTERN PENINSULA; from MALABAR and the NILGHERRY HILLS southwards, *Heyne*, &c. MALACCA, *Griffith*; CEYLON, *Gardner*, &c.—DISTRIB. Malay Islands, Mauritius, Trop. Africa.

Root more or less woody (except in seedlings). *Branches* 4–16 in., stout or more often slender, rarely scabrid on the angles and only beneath the leaves. *Leaves* much broader than in *S. stricta*, often membranous, quite glabrous or scabrid above, sometimes petioled. *Flowers* fewer and in smaller heads than *S. stricta*, with usually shorter bracteoles. *Calyx* rarely puberulous, teeth often unequal. *Seeds* usually broader and shorter than in *S. stricta.*—I follow Wallich in referring this to Burmann's plant. Wight & Arnott's *B. Roxburghiana* is not Wallich's 6186 of that name, nor is it Wight's plant of that name, nor is Wight & Arnott's *B. Kleinii* Wallich's *S. ocymoides*, No. 6185, as cited; both these plants of W. & A. having hispid calyces are referable to *S. stricta.*

** *Capsule septicidal, one mericarp remaining closed by the septum (which finally separates as a membranous plate), the other dehiscing ventrally.*

3. **S. hispida,** *Linn.*; *DC. Prodr.* iv. 555; procumbent, scabrid hirsute or hispid, leaves obovate spathulate oblong or elliptic obtuse or acute margins

flat or waved, capsule hispid or pubescent, seeds oblong granulate opaque. *Roxb. Fl. Ind.* i. 373; *Wall. Cat.* 825; *W. & A. Prodr.* 438; *Dalz. & Gibs. Bomb. Fl.* 111. S. articularis, *Linn. f.*; *Roxb. l. c.* 372; *Wall. Cat.* 827; *W. & A. l. c.*; *Kurz in Journ. As. Soc.* 1877, ii. 137. S. scabra, *Willd.*; *Roxb. l. c.* 371; *Wall. Cat.* 824. S. hirta, *Rottler in Nov. Act. Berol.* 1803, 95. S. longicaulis, *Wall.*; avana, *Wall.*; ramosissima, *Wall.*; and tubularis, *Br. in Wall. Cat.* 826, 828, 829, 836.—*Burm. Thes. Zeylan.* t. 20, f. 3. *Rheede Hort. Mal.* ix. t. 76.

Throughout India, from the WESTERN HIMALAYA at Simla, ascending to 3000 ft. to ASSAM, and southwards to CEYLON and SINGAPORE.—DISTRIB. S. China, Malayan Archipelago.

Root annual or perennial; branches 6–14 in., ascending, stout, 4-angled, scabrous hirsute or glabrous. *Leaves* $\frac{1}{2}$–1$\frac{1}{2}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., often rounded at the tip, rigidly coriaceous, pale when dry, margins sometimes thickened and cartilaginous, usually very scabrid above; nerves rarely impressed. *Flowers* 4–6 in a whorl; bracteoles filiform, equalling the calyx. *Calyx-teeth* linear-lanceolate. *Corolla* $\frac{1}{6}$–$\frac{1}{2}$ in., blue or white. *Stigmas* 2, very short. *Capsule* pubescent or hispid, rounded at the base. *Seeds* very variable, $\frac{1}{10}$–$\frac{1}{8}$ in. long, narrow or broad.—A maritime Carnatic form has very hairy branches and stout waved apiculate leaves with cartilaginous edges; it is Roxburgh's typical *S. hispida*, and passes by insensible gradations into other forms.

4. **S. scaberrima,** *Blume Bijd.* 946; leaves elliptic or elliptic-lanceolate acute scabrid above with deeply impressed nerves, capsule glabrous, seeds oblong granulate shining. *DC. Prodr.* iv. 555; *Miq. Fl. Ind. Bat.* ii. 331.

MALACCA, *Griffith.*—DISTRIB. Sumatra, Java, Banca.

Rather stout, 12–16 in., brown when dry; branches ascending, rather shining, nearly glabrous but scabrid or retrorsely hairy on the angles below the nodes. *Leaves* 1–1$\frac{1}{2}$ in., subsessile, rigidly coriaceous, very scabrid above, hardly so beneath; nerves very oblique. *Flowers* few. *Corolla* not seen. *Calyx-teeth* lanceolate. *Capsule* brown. *Seeds* small, oblong, with a large ventral cavity.

DOUBTFUL SPECIES.

S. BURMANNI, *DC. Prodr.* iv. 555. S. corymbosa, *Burm. Fl. Ind.* 34, *non Linn.*, is undeterminable.

S.? PROCUMBENS, *Linn.*; DC. l. c. is probably a *Hedyotis*.

S.? HEDYOTIDEA, *DC. l. c.* Hedyotis fruticosa, *Retz Obs.* ii. 8, *an Linn.*? See p. 49.

88. GAILLONIA, *A. Rich.*

Low rigid shrubs. *Leaves* small, opposite, linear or subulate; stipules usually connate with the petioles into an entire sheath with 2 bristles or obsolete. *Flowers* small, solitary, or in simple spiciform cymes, white. *Calyx-limb* 2–5-toothed, dilated after flowering into a scarious crenate wing or feathery bristles. *Corolla* funnel-shaped, throat naked; lobes 4–5, valvate in bud. *Stamens* 4–5, in the throat or tube of the corolla, filaments short; anthers linear-oblong. *Disk* inconspicuous. *Ovary* 2-celled; style filiform, arms 2 short; ovules 1 in each cell on the centre of the septum, amphitropous. *Fruit* ovoid, of 2 terete indehiscent cocci crowned with the enlarged calyx. *Seeds* oblong, grooved ventrally, albumen horny; cotyledons flat, radicle slender inferior.—DISTRIB. Species 10, N. African and W. Asian.

1. **G. calycoptera,** *Jaub. & Spach Ill. Pl. Or.* i. 147, t. 80; glabrous, leaves linear, stipules of the floral leaves minutely 6–8-toothed, flowers spicate, fruit with erect wings. *Boiss. Fl. Or.* iii. 15. Spermacoce calyptera, *Dcne. Flor. Sinaic.* 29.

THE PUNJAB; dry hills near Attock, *Falconer, Stewart.*—DISTRIB. Nubia, Arabia, Persia.

A small shrub, with slender, erect, terete, strict, dichotomously forked branches, the lower white. *Leaves* in distant pairs, ½–1 in., black when dry, scaberulous, margins revolute. *Fruit* about ⅓ in. long, of 2 narrowly oblong puberulous cocci surmounted by an erect scarious calyx-limb; segments of limb free or connate, elliptic, acute, white, veined, much longer than the cocci.—The Indian specimens are very imperfect.

2. **G. hymenostephana,** *Jaub. & Spach Ill. Pl. Or.* i. 146, t. 79; hoary and scaberulous, leaves linear-oblong with obsolete stipules, floral connate with 2-lobed stipules, flowers terminal solitary and fascicled, fruit with a large orbicular horizontal 5-lobed wing. *Boiss. Fl. Or.* iii. 15.

PUNJAB, *Fleming.* WUZURISTAN, alt. 3500 ft., *Stewart.*—DISTRIB. Arabia, Beluchistan, Affghanistan.

A very small shrub, "most fœtid when fresh," *Stewart*, with opposite divaricating strict slender branches. *Leaves* ¼–½ in., margin revolute. *Fruit* of 2 small hispid cocci; the calyx-limb ¼–½ in. diam., pubescent or glabrate, membranous, reticulately veined.

TRIBE XVI. **GALIEÆ.**

89. **RUBIA,** *Linn.*

Scabrid hispid or prickly erect diffuse or climbing herbs; stems square, slender. *Leaves* 4–8 in a whorl, rarely opposite and stipulate. *Flowers* small or minute, in axillary and terminal cymes, pedicel jointed with the ovary. *Calyx-tube* ovoid or globose; limb 0. *Corolla* rotate or shortly bell- or funnel-shaped; lobes 4–5, valvate. *Stamens* 4–5, inserted on the corolla-tube, filaments short; anthers globose or oblong. *Ovary* 2-celled; style 2-fid or styles 2, stigma capitate; ovules 1 erect in each cell, attached to the septum. *Fruit* small, didymous, fleshy, or globose by the suppression of a carpel. *Seeds* suberect, adhering to the pericarp, testa membranous; cotyledons broad thin, radicle slender inferior.—DISTRIB. Species about 30, chiefly temperate.

1. **R. cordifolia,** *Linn.*; *DC. Prodr.* iv. 588; scandent, leaves 4 in a whorl petioled ovate-cordate acute, nerves 3–7 from the base very strong. *Wall. Cat.* 6209; *W. & A. Prodr.* 442; *Dalz. & Gibs. Bomb. Fl.* 121; *Wt. Ill.* t. 128, *bis.* f. 1. R. Munjista, *Roxb. Hort. Beng.* 10; *Fl. Ind.* i. 374; *DC. l. c.*; *Wt. Ic.* t. 187. R. Mungisth, *Desv. Journ. Bot.* 1814, 207. R. javana, *DC. l. c.* R. secunda, *Moon Cat.* 10. R. alata, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 384; *Cat.* 6208; *DC. l. c.* R. purpurea, *Dcne. in Jacq. Voy. Bot.* 84, t. 92. R. scandens, *Zoll. & Morr.*; *Miq. Fl. Ind. Bat.* ii. 338. R. chinensis, *Regel & Maack in Reg. Fl. Ussur.* 76, f. 8, t. 1. R. mitis, *Miq. in Ann. Mus. Lugd. Bat.* iii. 112.

Throughout the hilly districts of India, from the N.W. HIMALAYA eastwards, ascending to 8000 ft., and southwards to CEYLON and MALACCA.—DISTRIB. N.E. Asia from Dahuria to Japan and Java, Tropical Africa.

Climbing; root perennial; branches stout, smooth, or more often with the nerves beneath (usually) retrorsely scabrid. *Leaves* smooth or scabrid; lower 2–4 in.; petiole 1–3 in., 2 often longer and with larger blades, upper leaves sometimes acute at the base, shorter petioled. *Cymes* panicled, terminal; branches trichotomous spreading, with opposite sessile leafy cordate bracts. *Flowers* minute, 5- rarely 4-merous. *Corolla-lobes* lanceolate, tips incurved. *Anthers* globose. *Fruit* ⅛–⅙ in. diam., didymous or globose.—A very variable plant. The Khasian specimens have usually 3-nerved leaves, not impressed above; in Western Peninsula the nerves are 5–7, and deeply impressed. Eastern Himalayan specimens of Griffith's

have hispid branches and leaves pubescent beneath; they have neither flowers nor fruit.

2. **R. tinctorum,** *Linn.*; *DC. Prodr.* iv. 589; scandent, leaves subsessile 4–6 in a whorl elliptic or lanceolate acuminate penni-nerved, nerves very obscure. *Boiss. Fl. Or.* iii. 17.

KASHMIR, *Falconer*, and SINDH, *Stocks*; cultivated in both.—DISTRIB. Affghanistan and westward to Spain, cultivated or wild.

Stem elongate; angles scabrid or prickly. *Leaves* 2–4 by ½–1¼ in., acuminate, margins and nerves beneath prickly. *Cymes* terminal, panicled, spreading, leafy. *Corolla* rotate; lobes ovate-lanceolate, apiculate. *Anthers* linear-oblong. *Fruit* ⅛–⅙ in. diam., didymous and globose.

3. **R. himalayense,** *Klotzsch in Pr. Wald. Reise Bot.* 86, t. 76; leaves elliptic-ovate or obovate subacute or tip rounded often apiculate penni-nerved, nerves very obscure. R. aculeata, *Royle Ill.* 237, *name only.*

WESTERN HIMALAYA; Kunawur, *Royle, Munro.* Kashmir, *Falconer.*—DISTRIB. Affghanistan.

This differs markedly from *R. tinctorum* in its slender habit, shorter broader more distinctly petioled leaves, which are also membranous and are usually obovate with a rounded apiculate tip; the corolla, too, is more funnel-shaped. Griffith observes that it occurs in hedges and fields, and that he did not see it cultivated, whereas he marks *R. tinctorum* as cultivated.

4. **R. sikkimensis,** *Kurz in Journ. As. Soc.* 1874, ii. 188; scandent, scabrid, leaves sessile 4 in a whorl elliptic or ovate-lanceolate acute or acuminate 3–5-nerved from the base.

EASTERN HIMALAYA; from Sikkim, alt. 2–5000 ft., *J. D. H.*, &c.; and Bhotan, *Griffith*, to the Mishmi mountains (Upper Assam).

A stout climber, branches retrorsely scabrid. *Leaves* 3–6 by 1–2 in., sometimes cordate, scabrid on both surfaces, sometimes pubescent beneath, base acute or rounded; nerves deeply impressed above. *Cymes* large, panicled; branches short, spreading, leafy. *Corolla* rotate, lobes subacute. *Anthers* globose. *Fruit* ⅙ in., smooth.—The handsomest species of the genus.

5. **R. Edgeworthii,** *Hook. f.*; scandent, pubescent all over, leaves short-petioled 4 in a whorl lanceolate acuminate 3–5-nerved from the base.

WESTERN HIMALAYA; Kumaon, alt. 3–4000 ft., *Edgeworth, Strachey & Winterbottom, Madden.*

Branches hardly scabrid, 8-ribbed, clothed, as are all parts (but less so on the leaves above), with white spreading pubescence. *Leaves* 2–3 by ½–¾ in., membranous, margins hardly scabrid, nerves deeply impressed above. *Cymes* as in *R. sikkimensis*, but more slender, and the branches ascending. *Corolla-lobes* lanceolate, acuminate. *Anthers* ellipsoid. *Fruit* glabrous.

6. **R. angustissima,** *Wall. Cat.* 6207; scandent, slightly scabrid, shining, leaves sessile 4–8 in a whorl very narrowly linear keeled nerveless. *G. Don Gen. Syst.* iii. 643; *Kurz in Journ. As. Soc.* 1877, ii. 162. R. charæfolia, *Wall. Cat.* 6210; *G. Don l. c.*

CENTRAL and EASTERN HIMALAYA, ascending to 4000 ft.; Nipal, *Wallich*; Sikkim, *J. D. H., C. B. Clarke.*—DISTRIB. Ava.

Stem excessively branched, ribbed, branches with short internodes. *Leaves* 1–4 by $\frac{1}{12}$–⅙ in., young filiform, thin and brittle, flat above, midrib strong beneath, smooth or sparingly scabrid. *Cymes* very small, often of only 3–5-flowers on a peduncle not longer than the small floral leaves or (the ♀?) on a slender peduncle ½ in. or less. *Flowers* minute. *Corolla-lobes* ovate, acute. *Anthers* ellipsoid. *Fruit* ¼ in. diam. when didymous, on a slender peduncle, solitary, globose or didymous, smooth.—Habit and aspect of a climbing *Asparagus.*

7. **R. tibetica,** *Hook. f.*; erect, short, scabrid, leaves sessile opposite or 4 in a whorl broadly ovate suborbicular or elliptic ovate or lanceolate, nerves obscure.

WESTERN TIBET; Nubra and Piti, alt. 10-14,000 ft., *Thomson, Lance*; Kulu, *Hay*, Karakorum mountains, alt. 10,700 ft., *C. B. Clarke.*

Root (or rhizome?) long woody brown, sending up fascicles of short stout erect stems as thick as a crow-quill, and covered with smooth glistening white bark, from which again arise fascicles of erect annual simple or sparingly divided branches 6-10 in. high; nodes of the stem below shortly sheathed with membranous bases of old leaves. *Leaves* $\frac{1}{2}$-1 by $\frac{1}{4}$-$\frac{1}{2}$ in., coriaceous, margins and midrib scabrid. *Cymes* axillary and terminal, shorter than the leaves, or flowers solitary on long axillary peduncles. *Flowers* rather large, $\frac{1}{4}$ in. diam. *Corolla-segments* lanceolate, acute. *Anthers* globose. *Fruit* $\frac{1}{8}$ in. diam., smooth.—The habit of this species is very peculiar, like that of some *Galia.*

8. **R. albicaulis,** *Boiss.*; *var.* stenophylla, *Boiss. Fl. Orient.* iii. 19; scandent? scabrid or almost smooth, leaves sessile opposite or 4 in a whorl linear or linear-lanceolate rigid, nerves 3 from the base the lateral marginal. R. Kotschyi, *Boiss. ll. cc.*

NORTH-WESTERN INDIA and Salt Range, alt. 2-8000 ft.; Murree, *Fleming*; Wuzuristan, *Stewart.*—DISTRIB. Affghanistan, Persia.

Stem woody below; branches rather stout, often white, quite smooth, upper green with white thickened angles. *Leaves* 1-4 by $\frac{1}{6}$-$\frac{1}{4}$ in., midrib and thickened marginal nerve almost quite smooth. *Cymes* axillary and terminal, much shorter than the leaves, many-flowered; peduncles and pedicels stout. *Flowers* minute, yellow. *Corolla-segments* lanceolate, acuminate. *Anthers* ovoid. *Fruit* smooth. The flowers of Boissier's specimen of his var. *Kotschyi*, from Schiras, are smaller and more rotate than Griffith's Affghanistan ones, which he refers to it. They are funnel-shaped and glabrous in the Murree, &c., specimens.

90. GALIUM, *Linn.*

Glabrous, hispid, scabrid or prickly erect or scandent weak herbs; branches square. *Leaves* 3 or more in a whorl, rarely opposite and stipulate, broad or narrow. *Flowers* minute, in axillary and terminal cymes or peduncles, white yellow or greenish; pedicel jointed with the ovary. *Calyx-tube* ovoid or globose; limb 0. *Corolla* rotate or shortly funnel-shaped, lobes 4, rarely 3, valvate. *Stamens* 4, rarely 3, in the corolla-tube; filaments short; anthers didymous. *Ovary* 2-celled; style short, arms 2 with capitate stigmas; ovules 1 erect in each cell, attached to the middle of the septum. *Fruit* small, didymous, dry or nearly so, smooth granulate or tubercled, glabrous pubescent or hispid with hooked hairs. *Seed* adhering to the pericarp, plano-convex, grooved ventrally, testa membranous; cotyledons broad thin, radicle elongate inferior.—DISTRIB. About 150 species, chiefly temperate.

* Fruit covered with hooked hairs or bristles (rarely glabrous in 1. *rotundifolium*). See also 17. *G. setaceum.*

† *Leaves 3-nerved from the base.*

1. **G. rotundifolium,** *Linn.*; *DC. Prodr.* iv. 599; diffuse, leaves sessile or subsessile 4 in a whorl ovate or elliptic acute mucronate or obtuse 3-nerved from the base, cymes exceeding the leaves, branches divaricate. *Reichb. Ic. Fl. Germ.* t. 1198; *Boiss. Fl. Orient.* iii. 49. G. latifolium, *Ham. in Don Prodr.* 133. G. Hamiltoni, *Spreng.*; *DC. Prodr.* iv. 600. G. elegans, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 382; *Cat.* 6212; *DC. l. c.* G. punduanum, *Wall. Cat.* 7291.

Throughout the HIMALAYA and KHASIA MTS., alt. 4–10,000 ft., common. WESTERN PENINSULA; Nilgherry mts.—DISTRIB. Europe, N. Africa, W. Asia.

Perennial, glabrous or pubescent; stem and branches trailing. *Leaves* $\frac{1}{2}$–2 by $\frac{1}{3}$–$\frac{3}{4}$ in., rarely glabrous, margins usually flat. *Cymes* terminal; branches, peduncles, and pedicels very slender. *Corolla* white or yellowish-green, segments acute. *Fruit* small, clothed with hooked hairs, rarely glabrous.

VAR. *javanicum*; very hairy, internodes shorter, leaves often suborbicular or obovate apiculate, corolla more or less hairy. G. javanicum, *Blume Bijd.* 943; *DC. l. c.* G. Requienanum, *W. & A. Prodr.* 443; *Wt. Ic.* t. 1042 (hairs of fruit erroneous).—Nilgherry hills. Java.

VAR. *leiocarpa*, Miq. Fl. Ind. Bat. ii. 339; ovary and fruit glabrous.—Khasia mts., *J. D. H. & T. T.*—Java.

2. **G. boreale,** *Linn.*; *DC. Prodr.* iv. 600; erect, leaves sessile 4 in a whorl lanceolate obtuse rigid margins scabrid 3-nerved from the base, cymes axillary and terminal many-flowered. *Reichb. Ic. Fl. Germ.* t. 1186; *Boiss. Fl. Orient.* iii. 48.

WESTERN TEMPERATE HIMALAYA, alt. 5–11,000 ft.; Kashmir, *Falconer, Thomson*; Lahul, *Jaeschke.*—DISTRIB. N. and Central Europe, Asia and America, the Caucasus and Armenia.

Perennial, glabrous or pubescent; stems 1–2 ft. *Leaves* 1–2 by $\frac{1}{4}$–$\frac{1}{2}$ in., margins recurved when dry. *Cymes* suberect with short divaricate branches and ovate bracts. *Corolla* white, segments subacute. *Fruit* $\frac{1}{12}$ in. diam., clothed with hooked hairs.

†† *Leaves penni-nerved, or nerves obsolete (never 3-nerved from the base).*

3. **G. triflorum,** *Michx.*; *DC. Prodr.* iv. 601; erect or decumbent, almost smooth, leaves sessile 6–8 in a whorl penni-nerved and narrowly elliptic or lanceolate acuminate, or petioled and shorter and broader elliptic or obovate apiculate or acute, cymes few-flowered axillary and terminal. *Willd. Hort. Berol.* t. 66. G. gratum, *Wall. Cat.* 6211. G. asperuloides, *Edgew. in Trans. Linn. Soc.* xx. 61. Asperula galioides, *Jacq. Journ.* A. consanguinea, *Klotzsch in Pr. Wald. Reise. Bot.* 87, t. 74.

TEMPERATE HIMALAYA, alt. 6–10,000 ft., from Kashmir to Bhotan.—DISTRIB. N. Europe, Asia and America, Central America.

Perennial; stems usually straggling. *Leaves* very variable, the longer sessile forms 1$\frac{1}{2}$–2$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., the shorter petioled ones $\frac{1}{2}$–1 by 1$\frac{1}{4}$–$\frac{1}{3}$ in., upper sometimes 4 in a whorl, margins flat. *Cymes* small. *Fruit* small, clothed with hooked bristles.—Habit and odour of *Asperula odorata.*

VAR. *Hoffmeisteri*: leaves petioled obovate-spathulate rounded at the tip. Asperula Hoffmeisteri, *Klotzsch. l. c.* t. 75.

4. **G. Aparine,** *Linn.*; *DC. Prodr.* iv. 608; climbing, scabrid with reflexed hairs or prickles, leaves sessile 6–8 in a whorl linear or narrowly obovate-oblong usually narrower below the middle cuspidate, nerves obsolete, peduncles axillary 3-flowered. *Reichb. Ic. Fl. Germ.* t. 1197; *Boiss. Fl. Orient.* iii. 68; *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 382; *Cat.* 6213.

TEMPERATE HIMALAYA and WESTERN TIBET, ascending to 12,000 ft., from Kashmir and the Salt Range to Sikkim.—DISTRIB. Europe, N. Africa, N. and W. and Central Asia.

Annual, extensively rambling or climbing. *Leaves* very variable, $\frac{1}{2}$–1$\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., always mucronate with scabrid midrib and margins. *Peduncles* axillary and in terminal leafy panicles, longer or shorter than the leaves, rarely 1-flowered, peduncles stout. *Fruit* clothed with spreading hooked bristles.

5. **G. pauciflorum,** *Bunge Enum. Pl. Chin.* 35; nearly smooth, very slender, leaves sessile opposite or 4–6 in a whorl oblanceolate cuspidate penni-

nerved, nerves very slender, peduncles axillary and terminal 1-flowered. G. Aparine, *var.* pauciflorum, *Maxim. in Bull. Imp. Acad., Mel. Biol.* ix. 259.

WESTERN TIBET; Nubra, Pangim and Karakoram mts., alt. 12–14,000 ft., *Thomson, C. B. Clarke, Henderson.*—DISTRIB. N. China.

Annual, very much more slender than *G. Aparine*, and almost quite smooth. *Stems* filiform or capillary. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., membranous, midrib slender, margins minutely scabrid. *Peduncle* $\frac{1}{4}$–$\frac{1}{2}$ in., rarely 2-flowered. *Flowers* minute, white. *Fruit* very small, covered with hooked hairs.

6. **G. vestitum,** *Don Prodr.* 133; suberect, scaberulously pubescent all over, leaves sessile 4–5 in a whorl oblong obtuse rigid, margins recurved, nerves obsolete, cymes small terminal and axillary few-flowered.

WESTERN and CENTRAL HIMALAYA, alt. 6–10,000 ft.; Garwhal, *Falconer, &c.* Nipal, *Wallich.*

Perennial; stems stout for the size of the plant, ascending. *Leaves* $\frac{1}{4}$–$\frac{2}{3}$ in., equally pubescent on both surfaces. *Cymes* short, but longer than the leaves, branches short, divaricate. *Flowers* minute. *Fruit* very small, clothed with hooked hairs.

7. **G. hirtiflorum,** *Requien in DC. Prodr.* iv. 600; suberect or decumbent, glabrate or laxly clothed with long weak hairs, leaves sessile 4-nate linear obtuse or subacute, margins recurved, nerves obscure, cymes axillary and terminal longer than the leaves paniculate. G. ciliatum, *Don Prodr.* 133. G. Aparine, *Wall. Cat.* 6213, *in part.*

TEMPERATE HIMALAYA; Garwhal, *Falconer*; Nipal, *Wallich*; Sikkim, alt. 6–10,000 ft., *J. D. H.*

Stems weak, 1–2 ft., branched, shining, never scabrid, the spreading or reversed hairs being weak and long, or absent. *Leaves* $\frac{1}{2}$–1 by $\frac{1}{8}$–$\frac{1}{6}$ in., rather rigid, covered all over, or on the stout midrib beneath and margins only, with long hairs. *Cymes* horizontal, 1–2 in. long, slender, and with few slender divaricate distant pairs of branches. *Flowers* on slender pedicels, minute. *Corolla-segments* ovate, obtuse, ciliate. *Fruit* very small, $\frac{1}{10}$ in. diam., clothed with hooked bristles.

8. **G. confertum,** *Royle mss.*; clothed with soft spreading hairs, stems weak interlaced, leaves sessile 4–5 in a whorl broadly elliptic or obovate obtuse, margins flat, nerves obsolete, peduncles axillary and terminal very short 1-flowered.

WESTERN HIMALAYA; Kunawur, alt. 7–8000 ft., *Royle, Thomson.*

Root woody, giving off innumerable interlaced slender stems, 6–8 in. long. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., floral minute. *Peduncles* $\frac{1}{16}$–$\frac{1}{8}$ in. when flowering. *Corolla-segments* ovate-lanceolate, acuminate. *Ovary* hispid. *Fruit* not seen.

9. **G. paradoxum,** *Maxim. in Bull. Acad. Petersb., Mel. Biol. Dec.* xvi. 263; procumbent, very slender, quite smooth and almost glabrous, leaves petioled opposite and stipulate rarely 4 in a whorl orbicular or orbicular-ovate obtuse apiculate penni-nerved, flowers axillary and solitary and in very small terminal few-flowered cymes. G. stellariæfolium, *Franch. & Savat. Enum. Pl. Jap.* i. 213; ii. 392.

SIKKIM HIMALAYA; by water courses at Choongtam, alt. 8–9000 ft., *J. D. H.*—DISTRIB. Manchuria, Japan.

Annual? *Stems* flexuous, a span long, almost filiform, quite smooth, succulent. *Leaves* in distant pairs, $\frac{1}{4}$–$\frac{1}{2}$ in. long and as broad or rather less, perfectly smooth, very rarely with a few scattered appressed hairs; base rounded or narrowed into the distinct petiole $\frac{1}{6}$–$\frac{1}{4}$ in. long; nerves and midrib faint; stipules minute, interpetiolar, subulate. *Flowers* minute, if solitary and axillary on a pedicel $\frac{1}{8}$ in., when terminal 3-nate, or several on a very short branched peduncle. *Corolla-segments*

ovate, obtuse, glabrous. *Style* 2-fid at the top. *Ovary* densely clothed with hooked hairs. *Fruit* not seen.—A very curious *Galium*; the Sikkim specimens are smaller than the Manchurian, and resemble a *Nertera*.

10. **G. exile,** *Hook. f.*; minute, procumbent, stems capillary interlaced flexuous, leaves minute petioled opposite elliptic acute penninerved, peduncles solitary axillary and terminal 1-flowered.

SIKKIM HIMALAYA, by rivulets in the interior, alt. 12–14,000 ft.

A most delicate annual with soft weak stems a few inches long, procumbent amongst moss and not thicker than horse-hair. *Leaves* in distant pairs, $\frac{1}{12}$–$\frac{1}{6}$ in. long, narrowed into a short petiole, midrib and margins quite smooth; stipules interpetiolar, low, broad, most minute. *Fruiting peduncles* longer than the leaves. *Corolla* not seen. *Ovary* pubescent, about $\frac{1}{30}$ in. diam. *Fruit* $\frac{1}{16}$ in. diam., didymous, laterally much compressed, chestnut brown, rather shining, covered with hooked hairs.

** Fruit without hooked hairs (except 18. *setaceum*), tomentose pubescent scabrid tubercled granular or smooth. (See also 1. *rotundifolium*.)

† *Leaves penni-nerved, or nerves obsolete (never 3-nerved from the base).*

11. **G. serpylloides,** *Royle mss.*; softly pubescent, suberect, stem short much branched, leaves close-set sessile 4 in a whorl ovate oblong or elliptic obtuse margins recurved, nerves obscure, peduncles axillary and terminal 3-flowered, fruit densely clothed with long woolly straight (not hooked) hairs.

WESTERN HIMALAYA; Kunawur and Lahul, *Royle, Thomson, Jaeschke.*

Root woody, sending up innumerable suberect rather stout stems 2–4 in. high. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., midrib beneath strong. *Peduncles* stout, equalling or exceed- the leaves; pedicels short, stout. *Flowers* minute. *Calyx-segments* ovate, acute. *Fruit*, including the hairs $\frac{1}{8}$ in. broad.

12. **G. Mollugo,** *Linn.*; *DC. Prodr.* iv. 596; glabrous or slightly scabrid hispid or pubescent, stems long flaccid much branched, leaves sessile or petioled 6–8 in a whorl linear or narrowly linear-obovate acute or cuspidate, nerves obscure, cymes axillary and terminal panicled many-flowered, fruit glabrous granulate. *Reichb. Ic. Fl. Germ.* t. 1187; *Boiss. Fl. Orient.* iii. 53. G. asperifolium, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 381; *DC. l. c.* 598; *W. & A. Prodr.* 442. G. parviflorum, *Don Prodr.* 133. G. Aparine, *Wall. Cat.* 6213 *in part.* G. lividum, *Jacq. Journ.*

Mountainous parts of India, alt. 3–10.000 ft.; throughout the HIMALAYA, KHASIA MTS., BIRMA, the higher Ghats of the WESTERN PENINSULA, and MOUNTAINS of CEYLON.—DISTRIB. Europe, N. Africa, Temperate Asia, Ava.

Perennial; very variable. *Stems* 2–3 ft., scandent and rambling. *Leaves* $\frac{1}{2}$–1 by $\frac{1}{8}$–$\frac{1}{6}$ in., rather rigid, often polished above, margins usually recurved, midrib strong beneath. *Cymes* with short slender stiff divaricate branches, pedicels recurved in fruit. *Corolla* small, white, segments ovate. *Fruit* black, $\frac{1}{10}$ in. diam.

13. **G. tricorne,** *With.*; *DC. Prodr.* iv. 608; very scabrid, stems stout, leaves sessile 6–8 in a whorl linear or oblanceolate cuspidate, nerves obscure, peduncles stout axillary 1–3-flowered, fruit glabrous or scabrous granulate. *Reich. Ic. Fl. Germ.* t. 1198; *Boiss. Fl. Orient.* iii. 67.

WESTERN HIMALAYA; Kashmir, ascending to 13.000 ft.; and WESTERN TIBET, *Thomson*. Hills at ATTOCK, *Falconer*. WUZURISTAN, *Stewart*.—DISTRIB. Central and S. Europe, N. Africa, W. Asia.

A stout annual, 1–2 ft., retrorsely scabrid. *Leaves* 1–1½ by $\frac{1}{8}$–$\frac{1}{6}$ in., rigid, midrib strong beneath. *Peduncles* longer or shorter than the leaves, stout and elongate, with decurved tips in fruit. *Corolla* white; segments ovate, acute. *Fruit* large, $\frac{1}{6}$ in. diam.

14. **G. spurium,** *Linn.*; *DC. Prodr.* iv. 608; scaberulous, leaves subsessile 4–6 in a whorl elliptic-lanceolate or oblanceolate obtuse or acute penninerved, cymes slender elongate terminal and axillary, fruit glabrous smooth. *Boiss. Fl. Orient.* iii. 69.

KASHMIR, *Falconer, Thomson.*

Annual, glabrous; stems 2–3 ft., flaccid, rambling. *Leaves* 1–1½ in., usually obtuse, rather thin, midrib not strong beneath, and margins minutely scabrid. *Cymes* much longer than the leaves, with slender distant divaricate branches. *Corolla* minute, white; segments ovate, obtuse. *Fruit* $\frac{1}{10}$ in. diam., black.

15. **G. verum,** *Linn.*; *DC. Prodr.* iv. 603: erect, smooth, stem pubescent upwards, leaves sessile 8–10 in a whorl linear cuspidate glabrous margins revolute, nerves obscure, cymes numerous short many-flowered, fruit glabrous granular. *Reichb. Ic. Fl. Germ.* t. 1187; *Boiss. Fl. Orient.* iii. 62.

WESTERN HIMALAYA; Kashmir, alt. 5–10,000 ft., *Falconer*, &c.; Lahul, *Hay, Jaeschke.*—DISTRIB. Europe, N. Africa, N. and W. Asia.

Perennial; stems erect or rambling, 1–3 ft., terete. *Leaves* usually deflexed, very narrow, ½–1 by $\frac{1}{12}$–⅛ in., rigid. *Cymes* very numerous, pedicels short, straight in fruit. *Corolla* bright yellow; segments ovate, acute. *Fruit* $\frac{1}{10}$ in., often pubescent in Europe.

16. **G. acutum,** *Edgew. in Trans. Linn. Soc.* xx. 61; smooth, glabrous, stems interlaced, leaves sessile 6 in a whorl very small elliptic-lanceolate aristate margins recurved, nerves obsolete, peduncles axillary short 1-flowered, fruit glabrous granulate. G. floribundum, *Jacq. Journ.* G. himalayense, *Klotzsch in Pr. Wald. Reise Bot.* 88, t. 73.

TEMPERATE HIMALAYA; Kunawur, alt. 5000 ft., *Edgeworth*; Garwhal, alt. 10,000 ft., *Falconer*, &c.; Sikkim, alt. 9–13,000 ft., *J. D. H., C. B. Clarke.*

Perennial, black when dry; suberect and stiff, or flaccid and decumbent; stems 6–12 in., very leafy. *Leaves* close-set, often recurved, ⅙–¼ in., midrib strong beneath. *Peduncle* very stout when flowering, much shorter than the leaves, elongate and straight in fruit. *Corolla* very minute; segments lanceolate acuminate. *Fruit* $\frac{1}{10}$ in. diam.—I have noted the flowers as purplish in some Sikkim specimens, yellowish-white in others.

17. **G. tenuissimum,** *Bieb. Fl. Taur. Cauc.* i. 104; erect, scabrid, glabrous, excessively slender, widely divaricately branched, leaves 6 in a whorl narrowly linear scabrid aristate, nerves obsolete, cymes very large lax very slender few-flowered, fruit minute smooth glabrous. *DC. Prodr.* iv. 607; *Boiss. Fl. Orient.* iii. 73.

WESTERN HIMALAYA; Kashmir, alt. 5000–6500 ft., *Clarke.* PUNJAB; at Rawul Pindee, *Aitchison.*—DISTRIB. W. Asia, from Syria and the Caucasus to Greece.

Annual. *Stem* 6–12 in., usually retrorsely scabrid, subterete, di-tri-chotomously divided from the base, so that the whole plant forms a triangle with the apex at the root, leafy at the forks only. *Leaves* ½–¾ by $\frac{1}{16}$ in., rather broader beyond the middle, ciliate with rigid hairs, margins revolute. *Cymes* many times longer than the leaves, and very long pedicels capillary. *Corolla* minute, white or yellowish; segments cuspidate. *Fruit* $\frac{1}{12}$ in. diam., mericarps often free.—Too closely allied to *G. divaricatum*, Lam., which extends from Europe to Syria.

18. **G. setaceum,** *Lamk.*; *DC. Prodr.* iv. 609; erect, short, minutely scabrid or glabrous, branches filiform erect or divaricate, leaves 4–8 in a whorl filiform acute margins recurved lower short elongate-spathulate not aristate upper setaceous, cymes terminal and lateral capillary few-flowered, fruit most minute glabrous or with a few hooked hairs. *Boiss. Fl. Orient.* iii. 77. G. capillare, *Cav. Ic.* t. 191, f. 1.

THE PUNJAB, at Hussar, *Aitchison.*—DISTRIB. Beluchistan, Affghanistan, Asia Minor, and Greece.

Annual; stem erect, 6–8 in., terete. *Leaves* ½–¾ by $\frac{1}{50}$ in., the lower shorter and broader, margins revolute, hardly scabrid. *Cymes* equalling and exceeding the leaves; branches and pedicels capillary. *Corolla* most minute, glabrous, yellow. *Fruit* $\frac{1}{20}$ in. diam., glabrous or with a few short hooked hairs.—Described from Beluch and Affghan specimens, the Punjab ones being very imperfect.

19. **G. ceratophylloides,** *Hook. f.*; stems erect subsimple short very slender smooth and glabrous, leaves in close-set whorls of 6 horizontal and recurved very slender soft flat aristate, peduncles axillary shorter than the leaves 3-flowered, ovary glabrous.

KASHMIR, at Poosiana, alt. 8500 ft., *C. B. Clarke.*

Perennial? *Stems* 4–6 in., 4-angled, weak, filiform, perfectly smooth. *Leaves* ½ in., rather flaccid, longer than the internodes, finely acuminate and aristate, minutely scabrid towards the apex, margins hardly recurved, midrib not prominent beneath. *Peduncles* erect, with 2 subulate bracts at the tip. *Corolla* yellowish; segments lanceolate, long-acuminate. *Fruit* not seen.

†† *Leaves 3-nerved from the base.*

20. **G. vernum,** *Scop.*; *DC. Prodr.* iv. 605; slightly scabrid or pubescent, decumbent, weak, leaves shortly petioled 4 in a whorl elliptic tip rounded 3-nerved from the base, peduncles axillary shorter than the leaves few-flowered, fruit smooth glabrous. *Reich. Ic. Fl. Germ.* t. 1185; *Boiss. Fl. Orient.* iii. 80.

WESTERN HIMALAYA; Chumba, alt. 9000 ft., *C. B. Clarke.*—DISTRIB. Central and S. Europe, Siberia.

Perennial. *Stem* 6–10 in., sparingly branched, hairs reflexed. *Leaves* ¼–⅔ by ⅙–¼ in., membranous, nerves slender. *Peduncle* horizontal, ebracteate, pedicels very short. *Corolla* yellow, green; segments lanceolate.—The specimens are very scanty, and not in fruit; in the European plant the flowers are polygamous, the lateral ♂, the terminal hermaphrodite, and the peduncle is recurved in fruit.

91. ASPERULA, *Linn.*

Characters and distribution of *Galium*, but the corolla funnel-shaped.

1. **A. cynanchica,** *Linn.*; *DC. Prodr.* iv. 582; glabrous, stems very numerous ascending or erect, leaves small linear-oblong obtuse lower in whorls of 4 upper opposite, flowers glabrous in terminal fascicles, bracts linear acute, fruit granulate. *Wight Ill.* t. 128 *bis*; *Reich. Ic. Fl. Germ.* t. 1181; *Boiss. Fl. Orient.* iii. 40.

WESTERN HIMALAYA; Kashmir, alt. 8000 ft., *Falconer*, *C. B. Clarke*; Kistwar, alt. 7-9000 ft., *Thomson*; Garwhal, at Niti, alt. 11,500 ft., *Strach. & Winterb.*—DISTRIB. Europe, Asia Minor.

Glabrous, rarely sparsely pubescent, 4–10 in. high: stock woody; stems slender terete, branches 4-angled. *Leaves* scattered, ¼–⅔ by $\frac{1}{12}$–⅛ in., mostly opposite, often recurved, acute or obtuse, flat, thick, nerveless. *Flowers* at the naked tips of the slender branches in corymbiform fascicles or heads, subtended by 2 small linear-oblong bracts. *Corolla* pink or white, about $\frac{1}{10}$ in. long; segments 4, triangular, shorter than the tube. *Fruit* $\frac{1}{12}$ in. diam.

2. **A. brachyantha,** *Boiss.*; *Fl. Orient.* iii. 45; VAR. with longer corolla; glabrous or puberulous, stems very numerous erect virgate, leaves opposite shortly linear oblong obtuse, flowers tomentose in terminal heads or fascicles, bracts very short oblong obtuse, corolla funnel-shaped, fruit globose smooth.

WESTERN HIMALAYA; Kashmir, alt. 7–12,000 ft., *Falconer, C. B. Clarke*; Kunawur, *Royle, Thomson*, &c.—DISTRIB. Persia.

Very similar to *A. cynanchica*, and scarcely distinguishable except by the shorter always opposite leaves, shorter blunter bracts, and tomentose more capitate flowers; these latter have a longer corolla than in Persian *brachyantha*, in which the corolla is described by Boissier as of a dirty yellow colour. The colour of the Indian ones is not recorded.

ORDER LXXVI. **VALERIANEÆ.** (By C. B. Clarke.)

Herbs or (a few non-Indian species) shrubs. *Leaves* opposite, exstipulate, but often united at the base by a stipule-like line or rim, entire pinnatifid or pinnate. *Flowers* sessile, cymose, sometimes polygamous or diœcious, bracteate. *Calyx-tube* adnate to the ovary; limb obsolete in flower, in fruit often enlarged or pappose. *Corolla* superior; tube equal or gibbous or spurred at the base; lobes 3–5, imbricated in bud. *Stamens* 1–4, on the corolla-tube. *Ovary* inferior, 3-celled; cells 1-ovuled, or one 1-ovuled, the others barren or imperfect; style filiform, stigma 2–3-lobed or undivided; ovules pendulous. *Fruit* indehiscent, dry, 1-seeded, the two barren cells enlarged or reduced to filiform ridges. *Seed* pendulous; albumen 0 or scanty; embryo straight, radicle superior.—DISTRIB. Species 300, all cool and temperate regions except Australia and S. Africa.

Stamen 1, corolla yellow, calyx in fruit very small . . . . . . 1. PATRINIA.
Stamens 4, corolla red, calyx in fruit equally 5-lobed . . . . . 2. NARDOSTACHYS.
Stamens 3, calyx pappose in fruit . . . . 3. VALERIANA.
Stamens 3, calyx epappose in fruit . . . . 4. VALERIANELLA.

1. **PATRINIA,** *Juss.*

Erect, perennial herbs. *Leaves* entire or 1–2-pinnatifid or pinnate. *Cymes* corymbosely panicled; bracts narrow, free. *Calyx-limb* small or 0, not enlarged in fruit. *Corolla-tube* short or long; lobes 5, subequal, spreading, yellow. *Stamens* 1, or 3–5. *Ovary* 3-celled; stigma capitate; ovules 1 in each cell, or more often 2 cells barren. *Fruit* small, 3-celled, 1-seeded, the barren cells equalling the fertile or nearly so.—DISTRIB. Species 12, N. Asiatic and Sikkim.

1. **P. monandra,** *C. B. Clarke*; corolla small symmetric shortly funnel-shaped, stamen 1, fruit within an orbicular scarious veined bracteole.

SIKKIM HIMALAYA, alt. 4000 ft.; Simonbong, *J. D. H.*; Yoksun, Hee, *C. B. Clarke.*

Stem 2–4 ft., pubescent. *Leaves* entire or pinnatifid, terminal lobe oblong or linear, coarsely crenate-serrate or entire, sparsely pubescent. *Panicle* often $1\frac{1}{2}$ ft. long, and broad. *Corolla* $\frac{1}{16}$ in. long. *Stigma* peltate. *Bracteole* of the fruit $\frac{1}{4}$ in. diam., as broad or broader than long, beautifully veined.—Hance (*Symb. ad Fl. Sinic.* 5) does not mention the number of stamens in his *P. graveolens*, which may hence be either the Indian plant or the 4-stamened *P. ovata*, Bunge (Nov. Gen. et Sp. Chin. et Monghol. 23, t. 2).

2. **NARDOSTACHYS,** *DC.*

Erect, perennial herbs. *Leaves* entire, radical elongate spathulate; cauline few. *Flowers* capitate, heads in cymes; bracts oblong, free or nearly so. *Calyx-limb* 5-lobed; in fruit enlarged, membranous, veined. *Corolla* tubular-campanulate, base subequal; lobes 5, spreading, rosy. *Stamens* 4. *Ovary* 3-celled, 1-ovuled; style linear, stigma capitate. *Fruit* obovate, compressed, 3-celled, 1-seeded, the 2 barren cells smaller than the fertile. *Seed* obovate, compressed.

N. Jatamansi, *DC. Mem. Valer.* 7, t. 1, *Prodr.* iv. 624: *Royle Ill.* 242–244, t. 54. N. grandiflora, *DC. l. c.* 8, t. 2, *Prodr.* iv. 624; *Wall. Pl. As. Rar.* iii. 40. Patrinia Jatamansi, *Don Prodr.* 159, *and in Lamb. Cinch.* 177, *with fig.* Valeriana Jatamansi, *Wall. Cat.* 431, *not of Jones and Roxb.* Fedia grandiflora, *Wall. Cat.* 1187.

ALPINE HIMALAYA, alt. 11–15,000 ft.; from KUMAON to SIKKIM, ascending to 17,000 ft. in Sikkim, *J. D. H.*

Rootstock woody, long, stout, covered with fibres from the petioles of withered leaves. *Stem* 4–24 in., more or less pubescent upwards, often glabrate below, subscapose. Radical *leaves* 6–8 by 1 in., longitudinally nerved, glabrous or slightly pubescent, narrowed into the petiole; cauline 1 or 2 pairs, 1–3 in. long, sessile, oblong or subovate. *Flower-heads* usually 1, 3 or 5; bracts $\frac{1}{4}$ in., oblong, usually pubescent. *Corolla-tube* $\frac{1}{4}$ in. long, somewhat hairy within, as are the filaments below. *Fruit* $\frac{1}{8}$ in. long, covered with ascending white hairs, crowned by the ovate, acute, often dentate calyx-teeth.—There are two forms of this plant: a large-flowered, with usually glabrous bracts, and a smaller one, with the corolla-tube scarcely $\frac{1}{6}$ in. long, and the bracts densely shortly hairy; various intermediates occur. The product spikenard discussed by Sir W. Jones (*Asiat. Research.* ii. 405) was doubtless derived from *Nardostachys*; but the plant figured as *Valeriana Jatamansi* is *V. Wallichii*, DC.

3. VALERIANA, *Linn.*

Perennial herbs (the Indian species). *Leaves* entire pinnatifid or pinnate, radical often long-petioled and undivided. *Cymes* corymbosely panicled; bracts small, oblong or linear, persistent, free or nearly so. *Calyx-limb* in flower obscure, unrolling in fruit into 5–15 plumose bristles united at base into a short wide funnel-shaped tube. *Corolla-tube* funnel-shaped, base equal or sub-gibbous; lobes 5, spreading, pink or white. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; stigma shortly 2–3-fid or subentire. *Fruit* oblong-lanceolate, compressed, plano-convex, with 3 dorsal, 1 ventral, and 2 submarginal ribs, 1-celled, the 2 barren cells obsolete, crowned by the persistent pappus-like calyx.—DISTRIB. Species 150, in moist temperate and cool regions.

1. **V. dioica,** *Linn.*; *DC. Prodr.* iv. 637; glabrous, radical leaves long-petioled ovate entire obtuse, cauline pinnatifid, lateral lobes few narrow terminal obtuse, fruit glabrous. *Boiss. Fl. Orient.* iii. 85. V. pusilla, *Royle Ill.* 241.

TEMPERATE WESTERN HIMALAYA, from Kashmir to the Karakorum, alt. 11–13,000 ft.; frequent, *C. B. Clarke*, &c., and in Lahul, *Jaeschke.*—DISTRIB. N.W. Asia, Europe.

Rootstock slender, decumbent, stoloniferous. *Stem* 8–16 in., erect, simple, nodes microscopically pilose. *Flowers* diœcious or polygamo-monœcious; corymbs of ♂ compact, of ♀ more lax, especially in fruit; upper bracts $\frac{1}{6}$ in., broadly linear, usually exceeding the fruit.

2. **V. officinalis,** *Linn.*; *DC. Prodr.* iv. 641; subglabrous, leaves pinnate, segments numerous narrow entire or toothed, corymb large lax, fruit glabrous. *Boiss. Fl. Orient.* iii. 89. V. dubia, *Bunge in Ledeb. Fl. Alt.* i. 52; *Ledeb. Ic. Fl. Ross.* t. 350.

NORTH KASHMIR; Sonamurg, alt. 8–9000 ft., *Thomson, Levinge, C. B. Clarke*; Kunzlwan, alt. 7500 ft., *C. B. Clarke.*—DISTRIB. North and West Asia, Europe.

Rootstock short, suberect, hardly thicker than the stem, stoloniferous. *Stem* 1–3 ft., erect, corymbose above, nodes minutely hairy. Radical *leaves* 0 at flowering time or pinnate; the leaves on lateral autumn offsets near the root are often ovate entire or slightly toothed; cauline several, all pinnate; lobes (in the Indian plant, which is exactly *V. dubia*, Bunge) narrowly oblong or linear, often entire, much or sparingly toothed. Upper *bracts* $\frac{1}{10}$ in., oblong-linear, shorter than the fruits.—The European

V. officinalis has lanceolate and ovate-lanceolate leaflets, often much toothed or serrate.

3. **V. Jaeschkei,** *C. B. Clarke*; small, glabrous, radical leaves pinnate, pinnules many obtuse, cauline few pinnules linear, fruit hairy.

WESTERN HIMALAYA, Lahul, *Jaeschke.*

Rootstock short, thickened, emitting thick horizontal fibres. *Stem* 6–9 in., erect, simple, nodes minutely pilose. Radical *leaves* numerous at flowering time, segments 5–9, $\frac{1}{4}$ in. long, ovate to oblong; cauline 1 or 2 distant pairs, segments $\frac{1}{4}$–1 by $\frac{1}{20}$–$\frac{1}{10}$ in. *Corymbs* 1 in. diam.; flowers small; upper bracts $\frac{1}{10}$ in., narrow oblong.—Resembles generally *V. oligantha*, Boiss. (Fl. Orient. iii. 87), of which it might be the fully developed form; but that the fruit is pilose and the root is not long nor branching.

4. **V. elegans,** *C. B. Clarke*; puberulous, leaves all entire spathulate ovate or oblong obtuse, fruit hairy.

BALTISTHAN; Skardo, alt. 9000 ft., *C. B. Clarke.*

Rootstock woody, thick, branching, with thick horizontal fibres. *Stem* 6–9 in., erect, frequently branched from near the base, glabrous upwards. Radical *leaves* several at fruit-time, ovate; cauline several, similar, oblong. *Panicle* lax, in fruit dichotomously dividing into linear subsimple spikes; upper bracts oblong, small, hardly half the length of the fruit. *Flowers* small, bright pink (pappus red in dried specimens).

5. **V. Roylei,** *Klotzsch in Reis. Pr. Waldem. Bot.* 83, t. 85; stem glabrous, leaves all undivided petioled orbicular or cordate-ovate uppermost pair sessile, fruit glabrous.

WESTERN HIMALAYA, *Hoffmeister.*

Root tuberous. *Stem* 8 in., erect, simple. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in., at first puberulous, entire, or the lowest obscurely toothed; radical several at flower-time; cauline several pairs, all but the uppermost petioled. *Corymb* 1–2 in. diam.; upper bracts oblong-linear, as long as the fruit.—Not seen, the foregoing drawn up from Klotzsch's figure and description. The plant seems very near *V. pyrolæfolia*, which, however, has a different root.

6. **V. pyrolæfolia,** *Dcne in Jacquem. Voy. Bot.* 85, t. 93; sparingly pubescent, leaves all subentire, radical petioled orbicular or elliptic obtuse, cauline sessile ovate, fruit glabrous. V. bracteata, *Royle Ill.* 241, *without description, fide T. Thoms. ms.* Valeriana, sp. No. 12 and 13, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 9–14,000 ft., *Jacquemont,* &c.

Rootstock thick, branching, subhorizontal, with thick fibres. *Stem* 2–10 in., erect, simple, succulent, often pubescent, at least when young. Radical *leaves* often 1 in. diam., several at fruit-time; cauline $\frac{1}{2}$ in., all pubescent when young, subsucculent, nerved when mature. *Corymb* 1–2 in. diam., much more lax in fruit; upper bracts $\frac{1}{8}$ in., linear-oblong, equalling the fruit.—Can this be a form of *V. Wallichii?*

7. **V. Stracheyi,** *C. B. Clarke*; slender, pubescent, leaves lyrate-pinnate terminal lobe rhomboid, corymb lax dichotomously branching into straight slender spikes, fruit very pilose. Valeriana, sp 6, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 4–8000 ft., *Thomson, Strachey & Winterbottom,* &c.

Rootstock woody, very stout. *Stems* 6–12 in., erect, often branching from near the base, uniformly minutely pubescent. Radical *leaves* at flower-time 0; cauline leaves several, minutely pubescent, terminal lobe toothed or nearly entire. *Corymb* slender, lax in fruit; ultimate branchlets 1–2 in., simple, with distant minute lanceolate bracteoles which are much shorter than the fruit.

8. **V. Wallichii,** *DC. Mem. Valer.* 15, t. 4; pubescent, radical leaves several long-petioled cordate-ovate, cauline few or much smaller entire or pinnate, fruit hairy or nearly glabrous. *DC. Prodr.* iv. 640; *Wall. Pl. As. Rar.* iii. 40. V. villosa, *Wall. Cat.* 433, *not of Thunb.* V. Jatamansi, *Jones in Asiat. Research.* ii. *fig. at* p. 405; *Roxb. in Asiat. Research.* iv. 433, *Fl. Ind.* 163 (see *Royle Ill.* 243). V. Spica, *Vahl Enum.* ii. 13.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 10,000 ft. KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Affghanistan.

Rootstock horizontal, thick, with thick descending fibres. *Stem* 6–18 in., often decumbent below, very rarely divided. Radical *leaves* often 1–3 in. diam., deeply cordate, usually acute and toothed. *Corymb* 1–3 in. diam., not very lax even in fruit; bracteoles oblong-linear, as long as the fruit.—The typical large form of this, with acute toothed radical leaves and pilose fruits, is easily separable from *V. pyrolæfolia*; but there are smaller examples with the radical leaves elliptic entire, the fruits nearly glabrous, which are very near *V. pyrolæfolia*. Jones and Roxburgh named this plant *V. Jatamansi*, under the misapprehension (subsequently corrected by Wallich and Royle independently) that it produced the Jatamansi spikenard of *Nardostachys*. The name *V. Jatamansi* is hence to be suppressed.

9. **V. Hardwickii,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 166; pubescent below, leaves pinnate, pinnules 1–5 lanceolate acute, radical undivided usually disappearing before fruit-time, corymb in fruit lax, fruit hairy. *Wall. Cat.* 432, *Pl. As. Rar.* 39, t. 263; *Don Prodr.* 159; *DC. Prodr.* iv. 640. V. Hardwickiana, *Roem. & Schult. Syst.* i. *Mant.* 259. V. tenera, *Wall. Cat.* 435; *DC. Mem. Valer.* 16, *Prodr.* iv. 640. V. elata, *Don Prodr.* 159. V. javanica, *Blume Bijd.* 919. V. acuminata, *Royle Ill.* 241.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–12,000 ft. KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Java.

Rootstock hardly thickened, descending, fibrous. *Stem* 1–5 ft., erect, usually simple or corymbose only upwards, above often glabrous, nodes little pilose or sometimes densely white-barbate (*V. acuminata*, Royle). Radical *leaves* long-petioled, ovate, acute; lower rarely undivided (*V. tenera*, Wall.); cauline several, leaflets often 3, rarely more than 5, upper small. *Corymb* in fruit often 1 foot, repeatedly dichotomous, ultimate branchlets very short; upper bracteoles much shorter than the fruit.

VAR. *Hoffmeisteri*, Klotzsch in Reis. Pr. Waldem. Bot. 84 (sp.); stem strict slenderer nearly glabrous, leaves smaller, fruits glabrous or nearly so. Valeriana. sp 10, *Herb. Ind. Or. H. f. & T.*—Himalaya, alt. 10–12,000 ft.—Identified with *V. Hoffmeisteri* from Klotzsch's description only; it is not rare at high levels.

VAR. *Arnottiana*, Wight Ic. t. 1045–6 (sp.); large, middle cauline leaves often large with 7–9 large lanceolate pubescent leaflets, corymbs often large dense with ultimate branchlets 1–2 in. long.—Neilgherry Mts., alt. 6–8000 ft., *Wight*.

10. **V. Moonii,** *Arn. in Herb Hook.*; sparingly pubescent, large, radical and lower cauline leaves pinnate with many leaflets, middle cauline pinnate with 3–5 leaflets, fruits glabrous. V. villosa, *Moon Cat.* 5, *not of Thunb.* V. Hardwickii, *Thwaites Enum.* 159.

CEYLON, alt. 6000 ft.; frequent.

Rootstock long, horizontal, not woody nor thickened, fibrous at the distant nodes. *Stem* often 4 ft., nearly glabrous. *Leaves* gradually reduced in size and number of leaflets from the base upwards. *Corymb* close in flower, not exceeding 6 in. *Fruit* larger and wider than in *V. Hardwickii*, with the dorsal nerves wider apart, perfectly glabrous.—Thwaites has sent this plant as *V. Hookeriana* (C.P. 150), and as *V. Arnottiana* (C.P. 1729): these are exactly alike, and there is no other Ceylon form; which (as noted by Sir J. D. H. in *Thwaites Enum.*) may be a var. of *V. Hardwickii* with glabrous fruit. It dries very black.

11. **V. Hookeriana,** *W. & A. Prodr.* 444; sparingly pubescent, radical and lower cauline leaves pinnate with numerous leaflets, upper cauline few reduced or 0, fruit hairy. *Wight Ill.* t. 129.

MTS. of the DECCAN, NILGHERRY, PULNEY, and KURG, *Wight, G. Thomson.*

Rootstock woody, thick, horizontal, fibres thick. *Stem* 10–30 in., subscapose, nodes bearded. *Leaves* bracteiform except near the base of the stem, where they are pinnate with a large ovate toothed terminal lobe. *Corymb* usually compact in flower, in fruit sometimes elongate and laxly panicled.—Very doubtfully distinct from *V. Moonii.*

12. **V. Leschenaultii,** *DC. Mem. Valer.* 17; sparingly pubescent, radical leaves petioled oblong subentire, cauline few or several often sub-lyrate with small basal lobes, corymb contracted, fruit hairy. *DC. Prodr.* iv. 640; *Wall. Cat.* 6636; *W. & A. Prodr.* 444; *Wight Ic.* t. 1044.

NEILGHERRY MTS. and others in MYSORE and KURG, alt. 4–7000 ft.

Rootstock short, enveloped by the thick fibres. *Stem* 8–20 in., nearly glabrous, simple, often subscapose, nodes more or less hairy. Radical *leaves* 2–4 by ½–2 in., narrowed or almost rounded at the base, entire or sinuate-crenate. The scapose form has sometimes hairy fruits, and Wight has been unable in his own herbarium to settle what he would call *V. Leschenaultii* and what *V. Brunoniana.*

VAR. *Brunoniana*, W. & A. Prodr. 443 (sp.); cauline leaves small undivided or hardly any, fruit glabrous. *Wight Ic.* t. 1043. V. aquatica, *Schldl. in Herb. Hohenacker*, n. 1339 (sp.).—Neilgherry Mts., frequent.

13. **V. Beddomei,** *C. B. Clarke*; glabrous, radical leaves pinnate with numerous oblong leaflets, cauline smaller with several linear leaflets, corymbs contracted, fruit glabrous. V. microphylla, *Bedd. in Trans. Linn. Soc.* xxv. 219, *not of H. B. K.*

ANAMALLAY MTS., alt. 7000 ft., *Beddome.*

Rootstock (summit alone seen) horizontal, not woody nor thickened. *Stem* 4–12 in., erect, simple, nodes hairy. Radical *leaves* 3 by ¾ in.; leaflets 11–25, ⅓ by ⅛ in., with few irregular obtuse teeth, sublobed or entire; leaflets of cauline 5–13, ⅓ by $\frac{1}{16}$ in. *Corymb* in young fruit 2½ in. long.

4. VALERIANELLA, *Moench.*

Annual herbs, dichotomously branching. Radical *leaves* rosulate, entire; cauline entire or toothed, rarely pinnatifid. *Cymes* corymbosely panicled or subcapitate; bracts free. *Calyx-limb* at flower-time small or obsolete; in fruit variously enlarged, equal or one-sided, sometimes aristate, never plumose. *Corolla-tube* short, base equal or gibbous, never spurred; lobes 5, spreading, white rose or pale blue. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; style minutely 3-fid or subentire. *Fruit* ovoid or cylindric, straight or curved, the 2 barren cells inflated, as large as the fertile, or small, or reduced to filiform ridges.—DISTRIB. Species 47, European, Asiatic, N. American.

1. **V. dentata,** *Poll. Hist. Pl. Palat.* i. 30, *not of DC.*; leaves oblong entire or sparingly toothed, fruit ovoid subconical pubescent barren cells reduced to filiform ridges, calyx-limb obliquely truncate toothed much shorter than the fruit. V. Morisonii, *DC. Prodr.* iv. 627; *Boiss. Fl. Orient.* iii. 105; *Krok Valerianella*, 42, t. i. *fig.* 6. V. microcarpa, *Lois.*; *Krok. l. c.* 36, t. i. *fig.* 3.

KASHMIR, *Thomson.*—DISTRIB. of the genus.

Stem 3–12 in., often much branched from the base, glabrous or minutely pubescent. *Leaves* 1–1½ by ¼–½ in. *Flowers* white, in small heads; bracts small, narrow-lanceolate. *Fruit* $\frac{1}{12}$ in., the two filiform cells forming a rim round an ovate-oblong slight depression.

2. **V. Szovitziana,** *Fisch. & Mey. Ind. Sem.* iii. 48; leaves oblong-linear

entire and sparingly irregularly toothed, fruit ovate-oblong pubescent or hairy barren cells as large as the fertile, calyx-limb shortly cylindric truncate reticulately nerved with one long horizontal linear tooth as long as the capsule or nearly so. *Krok. Valerianella*, 58, t. 2, *fig.* 17; *Boiss. Fl. Orient.* iii. 101. V. Aucheri, *Boiss. Diagn.* 1 ser. iii. 58.

KASHMIR, alt. 5–6000 ft., *Falconer, Thomson*, &c.

Stem 2–20 in., minutely pubescent. *Leaves* 2 by $\frac{1}{3}$ in., glabrous or obscurely puberulous. *Corymbs* in fruit subpaniculate; bracts small, narrow-oblong. *Fruit* $\frac{1}{8}$–$\frac{1}{6}$ in., scarcely curved, hairy especially on one side, or pubescent, or with microscopic short hairs resembling glistening dots.

ORDER LXXVII. **DIPSACEÆ.** (By C. B. Clarke.)

Herbs or (non-Indian species) rarely shrubs, glabrous, hairy, or prickly. *Leaves* opposite or whorled, exstipulate, sometimes connate at the base, entire, toothed, lobed or pinnate. *Flowers* scattered in cymes, whorled in spikes, or more often in dense heads, surrounded by bracts; bracteoles often present as scales of the receptacle; ovary free or adnate to a narrow funnel-shaped or utricular enveloping involucel. *Calyx-tube* adnate to the ovary, usually constricted above it; limb expanded, cup-shaped or bristly. *Corolla* funnel-shaped; limb 2–5-fid, equal or 2-lipped, or in the ray-flowers 2-labiate; disk-flowers equal. *Stamens* 4 or 2, inserted high on the corolla-tube; anthers exserted, linear-oblong. *Ovary* 1-celled; style filiform, stigma capitate or linear terminal or lateral; ovule 1, pendulous. *Achene* dry, enveloped by the involucel and often adnate thereto, crowned usually by the calyx-limb. *Seed* pendulous, albumen copious or scanty; embryo straight, radicle superior.—DISTRIB. Species 120, chiefly Mediterranean, Western Asiatic, South African, Japanese, and Cingalese; none in America, Polynesia, or Australia.

Flowers small, scattered in 2–3-chotomous cymes . . . . 1. TRIPLOSTEGIA.
Flowers 2-lipped, whorled on a spike . . . . 2. MORINA.
Flowers in dense peduncled heads, calyx-limb muticous . . . . 3. DIPSACUS.
Flowers in heads, calyx-limb bristly . . . . 4. SCABIOSA.

1. **TRIPLOSTEGIA,** *Wall.*

An erect, perennial, slender herb, glandular-pubescent upwards. *Leaves* petioled, toothed or pinnatifid, uppermost distant, small, sessile. *Cymes* lax, 2–3-chotomous; bracts at the divisions, small, narrow-oblong; flowers very small, sessile or shortly pedicelled, with 2 opposite, free, narrow-lanceolate, small bracts, and 4 similar bracteoles, glandular; involucel an 8-ribbed utricle, nearly closed at the mouth over the fruit. *Calyx-limb* minute, obscurely toothed. *Corolla-tube* funnel-shaped; lobes 5, equal, spreading, pink-purple. *Stamens* 4, inserted near the base of the corolla-tube, subincluded. *Style* linear, stigma capitate. *Achene* shortly beaked, free within the utricular involucel, obscurely 4-ribbed, crowned by the unaltered calyx-limb. *Seed* pendulous, albumen plentiful; embryo scarcely shorter than the seed.

1. **T. glandulifera,** *Wall. Cat.* 436; *DC. Prodr.* iv. 642. T. glandulosa, *DC. Mem. Valer.* 20, t. 5.

TEMPERATE and ALPINE HIMALAYA, alt. 8–14,000 ft.; from Gurwhal to Bhotan, *Wallich*, &c.

Rootstock slender, horizontal. *Stem* 6–24 in., erect, simple or corymbosely branched, below pubescent or nearly glabrous, above with hairs tipped by large glands. *Leaves* 2 by 1 in., hairy. *Flowers* $\frac{1}{12}$ in. *Achenes* $\frac{1}{12}$ in.; involucel as long.—In fruit the ovary-wall becomes excessively thin, and on a cross-section may be mistaken for

the involucel. The achene may be recognised by its short beak crowned by the much wider calyx-limb.

2. MORINA, *Linn.*

Perennial herbs, resembling spiny *Labiatæ*. *Leaves* opposite or whorled, narrowly oblong or linear, spinous-toothed, or in *M. nepalensis* unarmed. *Flowers* whorled; whorls in spikes, surrounded by wide-based floral leaves; bracteoles among the flowers few, spinous; involucel long funnel-shaped, mouth truncate, aristate or spinous. *Calyx-limb* herbaceous, 2-lipped; lips entire or 2-fid. *Corolla-tube* elongate funnel-shaped, curved; mouth oblique, 2-labiately 5-lobed. *Stamens* inserted at the mouth of the corolla-tube, 2 fertile (with or without 2 rudimentary) or 4 fertile. *Style* subexsert, stigma entire. *Achene* free in the base of the involucel; pericarp usually thickened, wrinkled; apex oblique.—DISTRIB. Species 7 or 8, in West and Central Asia.

1. **M. persica,** *Linn.*; *DC. Prodr.* iv. 644; tall, calyx-lobes subequal obovate-oblong entire or emarginate, corolla pink, fertile stamens 2, filaments usually as long as the corolla-lobes. *Sibth. Fl. Græc.* t. 28; *Boiss. Fl. Orient.* iii. 114. M. Wallichiana, *Royle Ill.* 245, t. 55, *fig.* 1. M. Tournefortii, *Jaub. & Spach.* v. *Ic. Pl. Or.* 32, t. 429. M. græca *and* Aucheri, *Jaub. & Spach. l. c.*

WESTERN HIMALAYA, alt. 7–9000 ft. from Kashmir to Kumaon, frequent.—DISTRIB. From Persia to Greece.

Stem 3–4 ft., pubescent or villous upwards. *Leaves* 6 by 1 in., sessile, doubly spinous-toothed, pubescent or glabrous. *Spikes* elongate. *Bracts* free or nearly so, and involucels hairy or villous. *Calyx-lips* $\frac{1}{6}$–$\frac{1}{3}$ by $\frac{1}{8}$ $\frac{1}{4}$ in. *Corolla-tube* 1–1$\frac{1}{2}$ in.

2. **M. longifolia,** *Wall. Cat.* 426; tall, calyx-lobes unequal 2-fid with rounded not spinous lobes, corolla pink, fertile stamens 2, filaments much shorter than the corolla-lobes. *DC. Prodr.* iv. 644; *Wall. Pl. As. Rar.* iii. 1, t. 202; *Bot. Reg.* 1840, t. 36; ? *Bot. Mag.* t. 4092. M. elegans, *Fisch. et Lallem. Ind. Sem. Petrop.* viii. 67.

TEMPERATE and ALPINE HIMALAYA, alt. 9–14,000 ft., from Kashmir to Bhotan.

Stem 3–4 ft., pubescent or villous upwards. *Leaves* 6 by 1 in., sessile, doubly spinous-toothed, pubescent or glabrous. *Bracts* free or nearly so, and involucels hairy or villous. *Calyx-lips*, one $\frac{1}{4}$ by $\frac{1}{5}$ in., the other usually much smaller. *Corolla-tube* 1 in.—Closely allied to the preceding species.

3. **M. Coulteriana,** *Royle Ill.* 245; tall, calyx-lobes subequal bifid with lobes acute mucronate or spinous, corolla yellow, fertile stamens 2, filaments half as long as the corolla-lobes. M. breviflora, *Edgw. in Trans. Linn. Soc.* xx. 62.

SUBALPINE HIMALAYA, alt. 9–13,000 ft., from Kashmir to Gurwhal.—DISTRIB. Kashgar.

Stem 2–3 ft., more or less hairy upwards. *Leaves* 6 by $\frac{3}{4}$ in., sessile, spinous-toothed, glabrous. *Bracts* free or nearly so, and involucels hairy. *Calyx-lips* $\frac{1}{5}$ by $\frac{1}{6}$ in. *Corolla-tube* $\frac{1}{2}$–$\frac{3}{4}$ in. *Seeds* $\frac{1}{4}$ by $\frac{1}{8}$ in., with a deep longitudinal furrow on one side.—*Bunge Rel. Lehm.* 321, places this plant in the sect. *Acanthocalyx* erroneously, for the fertile stamens are 2 only.

4. **M. polyphylla,** *Wall. Cat.* 425; tall, leaves many in a whorl, bracts to each flower whorl numerous linear-lanceolate, calyx-lips subequal 2-lobed. *DC. Prodr.* iv. 644.

TEMPERATE HIMALAYA; Nipal, at Gossainthan, *Wallich*; Gurwhal? *Falconer.*

Stems 2 ft., pubescent upwards. Lower *leaves* 12 by 1 in., doubly spinous-toothed, glabrous; upper similar but much smaller, often 6 in a whorl. *Flower-whorls* very

close together; bracts to each whorl often 6, adnate by their bases into a short campanulate cup $\frac{1}{4}$ to $\frac{1}{3}$ in. long; their free portions 1–1$\frac{1}{2}$ in., very narrow, shining. *Calyx-lips* $\frac{1}{5}$ by $\frac{1}{5}$ in., deeply lobed. *Flowers* not seen.

5. **M. nepalensis,** *Don Prodr.* 161; low, all the leaves without spines except the uppermost and the floral leaves, fertile stamens 4 subequal. M. nana, *Wall. Cat.* 424; *DC. Prodr.* iv. 645.

NIPAL; Gossainthan, *Wallich.*

Stem 3–6 in., pubescent upwards. *Leaves* 4 by $\frac{1}{3}$ in., entire, sinuate, glabrous; leaves near the flower-whorls spinous, obscurely toothed. *Flowers* few in few approximate whorls, forming one small terminal head. *Calyx-lip* $\frac{1}{5}$ in., obovate, subentire or mucronate, with 1 or 2 teeth; the other lip obsolete or nearly so. *Corolla-tube* $\frac{1}{2}$ in. *Filaments* hardly any.

6. **M. betonicoides,** *Benth. in Hook. Ic. Pl.* t. 1171; low, leaves all spinous scarcely toothed, fertile stamens 4 subequal.

SIKKIM HIMALAYA, alt. 10–13,000 ft.; Lachen and Yeumtong, *J. D. H.*; Singalehlah and Tumbok, *C. B. Clarke.*

Stem 6–18 in. Heads of *flowers* few, the lower sometimes remote. *Corolla* pale-purple.—This is perhaps the fully developed state of *M. nepalensis*, from which it only differs in having the lower leaves spinous as well as the uppermost.

3. DIPSACUS, *Linn.*

Stout erect herbs, prickly or bristly. *Leaves* opposite, toothed or pinnatifid. *Heads* terminal, long-peduncled; bracts subtending the heads, and bracteoles rigid, bristly or prickly. *Involucel* 4–8-ribbed, adnate often nearly its whole length to the ovary. *Calyx-limb* cup-shaped, 4-angled, 4-lobed. *Corolla-tube* funnel-shaped; limb 4-lobed, equal or sub-bilabiate, pale blue, white, yellowish, or black-purple. *Stamens* 4, perfect. *Style* filiform; stigma oblique or lateral. *Achene* adnate to the involucel in the Indian species, 8-ribbed, crowned with the (often deciduous) calyx-limb.—DISTRIB. Species 12, European, Abyssinian, and Asiatic.

1. **D. inermis,** *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 367, *as to var.* β; lower leaves pinnatifid with distant segments shortly hairy on both surfaces, upper leaves 3-fid or a few uppermost simple, heads subglobose, bracteoles obovate-oblong with a linear bristly mucro, flowers white or yellowish. *Coult. Dips.* 23; *DC. Prodr.* iv. 646; *Wall. Cat.* 427, *mainly.* D. mitis, *Don Prodr.* 161. D. Roylei, *Klotzsch in Reis. Pr. Waldem. Bot.* 83, t. 84. Cephalaria cachemirica, *Dcne in Jacquem. Voy. Bot.* 86, t. 94.

TEMPERATE HIMALAYA, alt. 6–12,000 ft., from Kashmir to Bhotan.

Stem 1 6 ft., bristly-hirsute, prickly or unarmed upwards, more hirsute under the flower-heads. *Flower-heads* solitary or several; bracts linear, acute or ovate obtuse, rigid or herbaceous, deflexed or adpressed, hairy or coarsely bristly. *Involucel* closely adnate to the pericarp, tipped by 4 minute points on the neck of the achene. *Calyx-limb* subquadrangular, glistening, white, hairy, deciduous.—Perhaps only a form of *D. pilosus*, Linn., which differs by the long hairs on the leaves, and by the flowers white to faint blue; there is no difference in the degree of freedom of the involucel, as Coulter (with scanty material) supposed.

VAR. *longicaulis*, Wall. Cat. 6856 (sp.); leaves on the nerves beneath and angles of the stem minutely prickly, otherwise glabrous or nearly so. D. strictus, *Var. Kurz in Journ. As. Soc.* 1877, pt. ii. 162.—Ava, *Wallich*; Martaban, alt. 2500 ft., *Brandis.*

2. **D. strictus,** *Don Prodr.* 160; many of the middle and upper cauline leaves undivided lanceolate sparingly hairy, heads subglobose, bracteoles obovate-oblong with a lanceolate bristly mucro, corolla cream-coloured. *DC. Prodr.* iv.

646. D. inermis, *Wall. in Roxb. Fl. Ind., ed. Carey & Wall.* i. 367, *as to var. a only*; *Wall. Cat.* 427, *partly.* D. auriculatus, *Royle Ill.* 245.

NORTH-WEST HIMALAYA, alt. 7000 ft., from Chumba to Kumaon.
Stem often 6–10 ft., and then with 3–1 heads only.—Probably a var. of *D. inermis.*

3. **D. asper,** *Wall. Cat.* 428; lower leaves pinnatifid with distant segments shortly pilose on both surfaces and scabrous beneath, heads subglobose, bracteoles obovate-oblong shortly mucronate, corolla white. *DC. Prodr.* iv. 646.

KHASIA MTS., alt. 4–6000 ft.; common.
Closely resembling *D. inermis*; the leaves are more hairy above, and on the nerves beneath nearly bristly.

4. **D. atratus,** *H. f. & T. ms.*; leaves pinnatifid or the upper trifid hairy on both surfaces, heads subglobose, bracteoles obovate-oblong with a lanceolate very hairy mucro, corolla intense blue-black.

SIKKIM HIMALAYA, alt. 10–12,000 ft.; Yeumtong and Lachen, *J. D. H., Elwes.*
Closely allied to *D. inermis.* *Stem* villous, as well as bristly. *Leaves* with larger hairs than *D. inermis.* *Bracts* ovate or oblong, obtuse; bracteoles blackish. *Corolla* only slightly pilose without.

5. **D. Leschenaultii,** *Coult.*: *DC. Prodr.* iv. 647; leaves pinnatifid lowest elongate with numerous approximate upper segments hairy on both surfaces, heads subglobose, bracteoles obovate-oblong with long-lanceolate densely hairy mucros, flowers white. *Wight. Ill.* t. 130; *W. & A. Prodr.* 445. Scabiosa Brunoniana, *Wall. Cat.* 429.

MTS. of the SOUTH DECCAN, alt. 7–8000 ft.; Neilgherries and Pulneys, frequent.
Lowest *leaves* often a foot or more by 3 in.; terminal lobe oblong, with numerous approximate falcate-oblong lobes next to it, with longish hairs on both surfaces, otherwise undistinguishable from *D. inermis.*

6. **D. Walkeri,** *Arn. Pugill. Pl. Ind. Or.* 26; bracteoles obovate-oblong with short-lanceolate sparsely hairy mucros, otherwise as *D. Leschenaultii.* *Wight. Ic.* t. 1166. D. Leschenaultii, *Thwaites Enum.* 160.

CEYLON, alt. 6–7000 ft.; frequent.
Dries blackish, while *D. Leschenaultii* dries green; the two are hardly distinct.

4. SCABIOSA, *Linn.*

Annual or perennial herbs, never bristly nor prickly. *Leaves* opposite, undivided, lobed or pinnatifid. *Heads* bracteate; bracteoles (scales of the receptacle) small or 0, or (in non-Indian species) herbaceous. *Involucel* 2–8-ribbed, adnate to the pericarp; limb generally expanded, broad funnel-shaped. *Calyx-limb* with short teeth and generally with long bristles. *Corolla* tubular; limb 4–5-fid, equal or, especially in the ray flowers, obliquely expanded. *Stamens* 4, perfect. *Style* filiform; stigma capitate or subpeltate, sometimes sublateral. *Achene* crowned by the persistent scarious expanded limb of the involucel, and by the persistent, usually aristate, calyx-limb.—DISTRIB. Species 80, chiefly European, West Asiatic, and African.

SECT. I. PTEROCEPHALUS. *Bracteoles* narrow. *Involucel-mouth* short, ciliate, pubescent. *Calyx-limb* of 12–24 long bristles. *Corolla* 5-fid.

1. **S. Hookeri,** *C. B. Clarke*; hairy, scapose, leaves linear-spathulate runcinate or subentire, corollas all subequal exceeding the calyx-bristles.

ALPINE SIKKIM, alt. 10–14,000 ft.; Tungu, *J. D. H.*, *Elwes.*

Rootstock woody. *Leaves* all subradical, 6 by $\frac{3}{4}$ in., alternate at the base, sessile or petioled. *Peduncles* 4–14 in., radical, 1-headed; heads 1–$1\frac{3}{4}$ in. diam., globose, many-flowered. *Bracts* $\frac{1}{2}$ by $\frac{1}{5}$ in., ovate-oblong, bracteoles $\frac{1}{2}$ in., linear-spathulate. *Involucel* $\frac{1}{8}$ in., hairy, not scarious. *Calyx-bristles* 20–24, $\frac{1}{2}$ in., filiform, hairy. *Corolla* $\frac{3}{4}$ in., tubular-funnel-shaped, hairy without.

SECT. II. ASTEROCEPHALUS. *Bracteoles* small or 0. *Involucel-mouth* funnel-shaped, scarious in fruit. *Calyx-limb* of 5 long bristles. *Corolla* 5-fid.

2. **S. Olivieri,** *Coult. Dips.* 36, t. 2, *fig.* 10; hairy, stem leafy, leaves narrowly oblong subentire or pinnatifid, heads small, bracts oblong-lanceolate, corollas all equal small much shorter than the calyx-bristles. *DC. Prodr.* iv. 656; *Boiss. Fl. Orient.* iii. 141.

WEST PUNJAB; Peshawur, *Vicary*; Rawul Pindee and Huzaree, *Stewart.*—DISTRIB. Affghanistan to Armenia and Arabia.

Stem 3–15 in., annual, often much branched. *Leaves* 2 by $\frac{1}{4}$ in., narrow-oblong and entire, or 4 by 2 in., deeply pinnatifid. *Heads* few-flowered; bracts scarcely $\frac{1}{4}$ in. *Flowers* purple, hairy without, little longer than the involucel. *Involucel* $\frac{1}{4}$ in. diam. in fruit, 16–20-ribbed, scarious between the ciliate-pilose ribs. *Calyx-bristles* $\frac{1}{3}$ in., barbellate, brown. *Achene* silkily hairy.

3. **S. Candolliana,** *Wall. Cat.* 430; subglabrous, leaves very distant linear subentire, heads small radiate, bracts ovate obtuse, corollas some exceeding the calyx-bristles. S. Candollii, *DC. Prodr.* iv. 654.

WESTERN HIMALAYA; from Murree to Kumaon, alt. 3–5000 ft., *Blinkworth*, &c.

Stem 12–18 in. from a perennial rootstock, little branched. *Leaves* $1\frac{1}{2}$ by $\frac{1}{8}$ in., lower subspathulate, puberulous. *Heads* few-flowered; bracts $\frac{1}{8}$–$\frac{1}{6}$ in. *Flowers* purple, hairy without; of the ray sometimes $\frac{1}{2}$ in. long. *Involucel* $\frac{1}{4}$ in. diam. in fruit, 16–20-ribbed, scarious between the pubescent ribs. *Calyx-bristles* $\frac{1}{3}$ in., barbellate, brown.

4. **S. speciosa,** *Royle Ill.* 245, t. 55, *fig.* 2; stem pubescent leafy, leaves oblong often pinnatifid at the base with small lobes, heads large radiate, bracts narrowly oblong, corollas much exceeding the calyx-bristles.

TEMPERATE HIMALAYA; from Kashmir (abundant) to Gurwhal, alt. 7–11,000 ft.

Stems 1–2 ft., often branched, from a perennial rootstock. *Leaves* 2 by $\frac{1}{3}$ in., hairy on both surfaces. *Heads* many-flowered; bracts $\frac{1}{2}$–$\frac{2}{3}$ in. *Flowers* bright-mauve, hairy without; those of the ray $\frac{3}{4}$ in. long, those of the disk exceeding the calyx-bristles. *Involucel* in fruit $\frac{1}{6}$ in., subcampanulate, nearly glabrous without, scarious between the 16–20 ribs. *Calyx-bristles* $\frac{1}{3}$ in., barbellate, nearly black. *Achene* $\frac{1}{4}$ in. and upwards, silky below, the upper $\frac{1}{3}$ 8-ribbed, with long deep pits between the ribs.

ORDER LXXVIII. COMPOSITÆ. (By J. D. Hooker.)

Herbs or shrubs, rarely trees. *Leaves* alternate, rarely opposite or whorled, simple or compound: stipules 0. *Inflorescence* a centripetal head of many small flowers, sessile on the dilated top of the peduncle (receptacle), enclosed in an involucre of whorled bracts; floral bracts 0, or reduced to paleæ scales or bristles on the receptacle. *Flowers* all tubular (head discoid), or the outer, or all, ligulate (head rayed), all 2-sexual, or the inner 2-sexual or male, the outer female or neuter, sometimes diœcious. *Calyx* superior; limb 0, or of hairs (pappus) or scales. *Corolla* of 2 forms: 1st, tubular or campanulate, 4–5-lobed, lobes valvate, with marginal nerves; 2ndly, ligulate, lobes elongate and connate into a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4–5, inserted within the corolla-tube; filaments usually free; anthers basi-fixed, usually connate; connective produced upwards; cells simple or tailed at the base; pollen sub-

globose, rough. *Ovary* 1-celled; style slender, 2-fid; arms (sometimes connate) linear, ½-terete, naked or externally pubescent or tipped by pubescent cones, margins stigmatic; ovule solitary, basal, erect, anatropous, nucleus with one coat. *Fruit* (an achene) dry, indehiscent. *Seed* erect, testa membranous, albumen 0; embryo straight, cotyledons plano-convex, radicle short.—AFFINITIES. Close with *Dipsaceæ*, *Valerianeæ*, and *Lobeliaceæ*. DISTRIB. Co-extensive with dicotyledonous vegetation; genera about 1000; species about 8000.

The Indian *Compositæ* have been more sedulously studied than any other equally large and intricate Indian family of plants. The first important contribution to our knowledge of them under well characterised genera is contained in Don's "Prodromus Floræ Nepalensis," wherein upwards of 60 species are described. Next came "Wight's Contributions to the Botany of India," where 126 species are described by De Candolle. This was followed by the great distribution of Wallich's Herbarium, in which 400 species are enumerated, many named for the first time, after having been referred in great part to their proper genera by Wallich himself, Brown, Bentham, and others. These numbers, however, do not represent more than about 300 distinct species. The volumes containing the *Compositæ* of De Candolle's Prodromus include most of the species distributed by Wallich, together with Wight's Peninsular ones, which were studied and named chiefly by Arnott, and distributed in like manner to Wallich's. The labours of these individuals and authors laid the foundation of all future knowledge of the Order in India. The greatest subsequent accession of species was the result of Dr. Thomson's journeys in the N. W. Himalaya and Tibet, and his and my own in East Nipal and Sikkim, which were hurriedly distributed after much labour in referring the *Compositæ* to their genera, and in many cases to their species, by myself; whilst at the same time I arranged the whole of the Indian material in the Hookerian and other herbaria of Indian plants then at Kew, which were in great confusion. After Dr. Thomson's return to India as Superintendent of the Calcutta Botanic Gardens, he devoted several years to a critical study of the Indian species, and on his retirement left in the Calcutta Gardens a ms. catalogue of all that were known to him. In 1873 appeared the first part of the second volume of Mr. Bentham's and my "Genera Plantarum," containing the *Compositæ* elaborated by Mr. Bentham. In this work many of the Indian genera were for the first time studied in relation to their allies in other countries, and various important changes were made as to their limitation and disposition in the Order, and suggestions as to the classification of their included species. This was followed in 1876 by the publication by my coadjutor, Mr. C. B Clarke, of his "Compositæ Indicæ," founded on the "Genera Plantarum" in respect of the genera, and on the rich Calcutta collections and Thomson's mss. in respect of the species. This valuable and very laborious work has been since annotated for me by its author with the Wallichian and Kew herbaria, and with various works to which he had not access in Calcutta. In the following revision of the genera and species I have adhered as closely as I could to the lines of Mr. Clarke's work, whilst describing the genera and discussing the species in accordance with my own views.

TRIBE I. **Vernonieæ.** *Heads* with the flowers all similar and tubular. *Anthers* cleft at the base. *Style-arms* subulate, hairy.—*Leaves* usually alternate. *Flowers* never yellow.

Subtribe 1. EUVERNONIEÆ. *Heads* distinct, many-flowered.

Achenes 4–5-angled. Pappus 0 . . . . 1. ETHULIA.
Achenes 8–10-ribbed. Pappus short, fugacious . . . . . 2. CENTRATHERUM.
Achenes terete, shining. Pappus scanty . . . . 3. LAMPRACHÆNIUM.
Achenes 10-ribbed. Pappus 0 . . . . 4. ADENOON.
Achenes 10-ribbed. Pappus long, copious . . . . 5. VERNONIA.

Subtribe 2. LYCHNOPHOREÆ. *Heads* 1 or few-flowered, crowded into dense masses like single heads.

Corolla usually cleft laterally. Pappus chaffy . . . . . 6. ELEPHANTOPUS.

TRIBE II. **Eupatorieæ.** *Heads* with the flowers all similar and tubular.

Anthers subentire at the base. *Style-arms* obtuse, papillose.—*Leaves* opposite or alternate. *Corolla* rarely orange, never yellow. *Pappus* usually bristly.

Subtribe 1. PIQUERIEÆ. *Anther-tip* truncate.

Achenes 5-angled . . . . 7. ADENOSTEMMA.

Subtribe 2. AGERATEÆ. *Anther-tip* appendiculate. *Achenes* 5-angled.

Pappus paleaceous . . . . 8. AGERATUM.
Pappus of slender hairs. Invol. bracts ∞ . . . . 9. EUPATORIUM.
Pappus of slender hairs. Invol. bracts 4 . . . . 10. MIKANIA.

TRIBE III. **Asteroideæ.** *Heads* with the flowers all similar, or the outer ligulate. *Anthers* subentire (cells not tailed) at the base. *Style-arms* flattened or plano-convex, all or those of the disk-flowers terminated by a cone.—*Leaves* usually alternate. *Receptacle* almost always naked. *Disk-flowers* yellow; ray-flowers yellow, white or purple.

Subtribe 1. HOMOCHROMEÆ. *Flowers* all yellow, those of the ray ligulate.

Ligules few. Heads in scorpioid panicles . . . . 11. SOLIDAGO.

Subtribe 2. GRANGEINEÆ. *Flowers* all yellow, ray 0. *Pappus* hardly any.

Receptacle usually elongate, top flat. Achenes obtuse, flat, with a thickened border . . . . 12. DICHROCEPHALA.
Receptacle elongate, top convex. Achenes obtuse, flat, without a thickened border . . . . 13. CYATHOCLINE.
Receptacle conic or convex. Achenes with a terminal, toothed or bristly ring . . . . 14. GRANGEA.

Subtribe 3. BELLIDEÆ. *Ray-flowers* ♀, ligulate, never yellow. *Disk-flowers* yellow. *Pappus* 0 or very short.

Erect herbs. Achenes viscid, hardly beaked . . . . 15. MYRIACTIS.
Erect rigid herbs. Achenes of ray beaked . . . . 16. RHYNCHOSPERMUM.
Small, stemless herb. Scape with 1 head . . . . 17. LAGENOPHORA.
Stem branched, branches with single heads. Achenes beaked 18. BRACHYCOME.

Subtribe 4. HETEROCHROMEÆ. *Ray-flowers* ♀, ligulate, never yellow. *Disk-flowers* yellow. *Pappus hairs* long, copious, except *Boltonia.*

Pappus of short bristles and 2–4 long hairs . . . . . . 19. BOLTONIA.
Outer invol. bracts green. Ligules long, 1-seriate . . . . 20. ASTER.
Outer invol. bracts green. Ligules very short . . . . . . 21. BRACHYASTER.
Outer invol. bracts green, narrow. Ligules 2–3-seriate . . 22. ERIGERON.

Subtribe 5. CONYZEÆ. *Ray flowers* very slender, tubular, or with very short ligules, and *disk-flowers* yellow. *Pappus* copious or scanty.

Tall or climbing herbs. Heads very small. Pappus long . 23. MICROGLOSSA.
Erect herbs. Heads various. Pappus long . . . . 24. CONYZA.
An erect herb. Heads small. Pappus scanty, short . . . 25. THESPIS.

TRIBE IV. **Inuloideæ.** *Heads* with the flowers all similar, or the outer ligulate. *Anther-cells* (except *Laggera* and *Phagnalon*) tailed. *Style-arms* linear, obtuse, or styles of the sterile fl. undivided.—*Leaves* usually alternate. *Disk* and *ray-flowers* usually both yellow.

Subtribe 1. PLUCHEINEÆ. *Heads* androgynous. *Invol. bracts* dry or herbaceous, rarely subscarious. *Receptacle* naked. *Style-arms* of ☿ fl. filiform, not truncate, or style of sterile fl. entire.

* *Heads corymbose or panicled, not in globose masses* (*except in some* Blumeas).

Herbs. Invol. bracts narrow. Pappus copious . . . . . 26. BLUMEA.
Herbs. Invol. bracts narrow. *Anther-cells ecaudate* . . . 27. LAGGERA.

Shrubs or undershrubs. Invol. bracts broad. Pappus copious 28. PLUCHEA.
A small rigid herb. Heads sessile. Corolla of ☿ fl. 2-lipped. Pappus 0 . . . . 29. NANOTHAMNUS.
Erect or diffuse herbs. Corolla of ☿ fl. tubular. Pappus 0 . 30. EPALTES.

** *Heads in dense, globose or ovoid masses. Corolla of ♀ fl. filiform.*

Herbs with winged stems. Pappus 0 . . . . 31. SPHÆRANTHUS.
Herbs with winged stems. Pappus hairs slender . . . . 32. PTEROCAULON.

Subtribe 2. FILAGINEÆ. *Heads* androgynous, often in dense clusters. *Ray-flowers* ♀, filiform, numerous, often enclosed in the long outer scales of the receptacle; *disk-flowers* ☿, central, with undivided styles, or, if divided with the arms, obtuse or subulate, not truncate. *Invol. bracts* scarious or hyaline, rarely radiating.

* *Achenes large, 2–4-angled, or many-ribbed, ciliated.*

Glabrous shrubs or undershrubs. Pappus hairs many, short, unequal. 33. BLEPHARISPERMUM.
Glabrous or woolly herbs. Pappus bristles very short, connate into a fimbriate ring . . . . 34. ATHROISMA.

** *Achenes small, not ribbed. Small woolly herbs.*

Pappus hairs simple . . . . 35. FILAGO.
Pappus hairs plumose . . . . 36. IFLOGA.

Subtribe 3. GNAPHALIEÆ. *Heads* androgynous or homogamous. *Invol. bracts* scarious, usually hyaline, or the inner radiating. *Receptacle* usually naked. *Style-arms* of ☿ fl. truncate.

* *Fl. ☿ all sterile, with undivided or merely notched styles. Inner invol. bracts often radiating. Heads often unisexual.*

Heads corymbose, always diœcious. Pappus hairs connate at the base . . . . 37. ANTENNARIA.
Heads glomerate, involucrate. Pappus hairs subconnate at the base . . . . 38. LEONTOPODIUM.
Heads corymbose. Pappus hairs quite free . . . . 39. ANAPHALIS.

** *Fl. ☿ all, or mostly fertile, with divided styles.*

Pappus hairs plumose. Minute herb . . . . 40. LASIOPOGON.
Anther-cells obtuse or apiculate (*without tails*) . . . . . 41. PHAGNALON.
Fl. ♀ 2–∞-seriate. Pappus hairs never barbellate . . . . 42. GNAPHALIUM.
Fl. ♀ 1-, rarely 2-seriate. Pappus hairs various . . . . . 43. HELICHRYSUM.

Subtribe 4. ANGIANTHEÆ. *Heads* homogamous, discoid, small, in crowded clusters. *Invol. bracts* few, hyaline. *Fl.* ☿ with truncate style-arms.

Heads 1-flowered in a leafy involucre. Pappus 0 . . . . 44. CÆSULIA.

Subtribe 5. EUINULEÆ. *Heads* heterogamous, radiate, rarely subdisciform or homogamous. *Flowers* usually all fertile. *Receptacle* naked. *Fl.* ☿ with linear style-arms, rounded or dilated at the top.

Heads rayed. Pappus hairs few or many, subequal. . . . 45. INULA.
Heads usually rayed. Achenes hardly ribbed. Pappus hairs slender, of ray few or 0 . . . . 46. VICOA.
Heads rayed or discoid. Achenes ribbed. Outer pappus of scales, inner of hairs . . . . 47. PULICARIA.
Heads discoid. Achenes slender, striate, beaked. Pappus 0 48. CARPESIUM.

TRIBE V. **Helianthoideæ.** *Heads* usually radiate. *Receptacle* paleaceous. *Anther-cells* not produced into tails. *Style-arms* truncate or appendicu-

late, or style of sterile fl. entire. *Achenes* 3–4-angled or terete or compressed. *Pappus* of 2–4 bristles or paleaceous or 0.

Subtribe 1. LAGASCEÆ. *Heads* 1-flowered in globose clusters; invol. bracts forming a 5-fid tube.

A villous or scabrid herb; lower or all the leaves opposite . 48*. LAGASCEA.

Subtribe 2. MILLERIEÆ. *Heads* few-flowered. *Fl.* ☿ sterile with undivided styles. *Receptacle* naked in the centre.

Achenes and inflorescence with stipitate glands . . . . . 49. ADENOCAULON.

Subtribe 3. MELAMPODIEÆ. *Heads* many-flowered. *Fl.* ☿ sterile with undivided styles. *Receptacle* paleaceous all over.

Achenes dorsally compressed, with acute margins, embraced by the paleæ of the receptacle . . . . 50. CHRYSOGONUM.

Subtribe 4. AMBROSIEÆ. *Heads* heterogamous or unisexual. *Fl.* ☿ sterile with undivided styles; ♀ apetalous. *Anthers* nearly free, with inflexed appendages.

Invol.-bracts of ♂ fl. free; of ♀ forming a 2-flowered 2-celled capsule armed with glochidiate spines . . . . 51. XANTHIUM.

Subtribe 5. VERBESINEÆ. *Heads* hetero- or homogamous. *Fl.* ☿ all fertile. *Achenes* of the disk angled, subterete, or laterally compressed, crowned with 2–3 bristles or scales or naked.—*Leaves* usually opposite.

* *Inner invol.-bracts embracing the achenes.*

Outer invol.-bracts 5-glandular . . . . 52. SIEGESBECKIA.
Outer invol.-bracts 4, broad, in opposite pairs, a marsh herb 53. ENHYDRA.

** *Inner invol.-bracts not embracing the achenes. Paleæ of receptacle flat, narrow.*

Outer invol.-bracts many . . . . 54. ECLIPTA.

*** *Inner invol.-bracts not embracing the achenes. Paleæ of receptacle concave, embracing the achenes.*

Ray-fl. ligulate, *sterile*. Achenes not winged nor ciliate . . 55. SCLEROCARPUS.
Ray-fl. with small ligules. Achenes not winged . . . . . 56. BLAINVILLEA.
Ray-fl. with large yellow ligules. Achenes thick . . . . 57. WEDELIA.
Ray-fl. with white or yellow ligules. Achenes ciliate . . . 58. SPILANTHES.

Subtribe 6. COREOPSIDEÆ. *Heads* hetero- or homogamous. *Fl.* ☿ all fertile or neuter. *Achenes* dorsally compressed, 2–4-awned or naked.

* *Outer invol.-bracts herbaceous, subequal; inner shorter like the paleæ of the receptacle.*

Achenes small, sub-4-angled, sheathed at the tip by the hairy corolla. Pappus 0 . . . . 58*. GUIZOTIA.
Achenes flat, margins lacerate and winged. Pappus of bristles 58*. SYNEDRELLA.

** *Outer involucral bracts few, small; inner membranous, connate below.*

Style-arms with short appendages. Leaves alternate . . . 59. GLOSSOCARDIA.
Style-arms with short appendages. Leaves opposite. Achenes usually 2–4-awned . . . . 60. BIDENS.
Style-arms with long appendages. Achenes with 2 bristles . 61. GLOSSOGYNE.
Style-arms with long appendages. Achenes awnless . . . 62. CHRYSANTHELLUM.

Subtribe 7. GALINSOGEÆ. *Heads* hetero- or homogamous. *Fl.* ☿ all fertile. *Achenes* with short bristle-like paleæ.

Pappus paleæ entire or fimbriate . . . . 62*. GALINSOGA.
Pappus paleæ awned, plumose . . . . 62*. TRIDAX.

TRIBE VI. **Anthemideæ.** *Heads* heterogamous, rayed or disciform, or rayless and homogamous. *Invol.-bracts* 2- ∞-seriate, dry or with scarious tips. *Receptacle* naked or paleaceous. *Anther-cells* not produced into tails. *Style-arms* truncate. *Pappus* 0 or a crown of short paleæ.—*Leaves* usually alternate. *Disk-fl.* yellow, *ray-fl.* variously coloured.

* *Receptacle paleaceous. Heads usually rayed.*

Achenes margined. Heads corymbose . . . . 63. ACHILLEA.
Achenes 4–5-angled or many-ribbed. Heads peduncled . . 64. ANTHEMIS.

* *Receptacle naked or with fimbriate pits.*

Heads rayed, shortly peduncled. Achenes 5-angled . . . . 65. ALLARDIA.
Heads rayed, usually long-peduncled. Achenes 5–10-ribbed . 66. CHRYSANTHEMUM.
Heads rayed. Achenes ventrally 3–5-ribbed, dorsally ∞-ribbed or plane . . . . 67. MATRICARIA.
Heads disciform, peduncled. Invol.-bracts 1–2-seriate . . . 68. COTULA.
Heads disciform, subsessile. Invol.-bracts spreading in frt. . 69. CENTIPEDA.
Heads disciform, subsessile, invol.-bracts 3–4-seriate incurved in frt. . . . . 70. SPHÆROMORPHEA.
Heads disciform, corymbose. Invol. bracts ∞-seriate . . . 71. TANACETUM.
Heads small, disciform, racemose or panicled . . . . . . 72. ARTEMISIA.

TRIBE VII. **Senecionideæ.** *Heads* heterogamous, rayed or disciform. *Invol.-bracts* usually 1-seriate and subequal, with a few short outer at their base, rarely ∞-seriate. *Anther-cells* obtuse below or with 2 short points rarely tailed. *Style-arms* of ☿ fl. truncate or appendaged. *Pappus* of fine hairs.—*Leaves* usually alternate. *Disk-fl.* yellow; rays usually also yellow.

Subtribe 1. TUSSILAGINEÆ. *Invol.-bracts* 1-2-seriate, subequal, free nearly to the base. *Style-arms* of fl. ☿ flattened or narrowly clavate, papillose, not hairy all round (as in *Eupatoriaceæ* or *Inuloideæ*).

Invol.-bracts 1-seriate. Heads rayed, bracteolate, solitary . 73. TUSSILAGO.
Invol.-bracts 2- or few-seriate. Heads rayed, drooping, usually solitary . . . . 74. CREMANTHODIUM.

Subtribe 2. EUSENECIONIDEÆ. *Invol.-bracts* 1–2-seriate, free nearly to the base, usually with a few smaller outer ones. *Style-arms* of ☿ fl. truncate or obtuse, penicillate or with a hairy tip.

* *Invol.-bracts herbaceous, broad, acuminate. Heads large, rayed, long-peduncled.*

Receptacle hemispheric. Herbs, leaves alternate . . . . 75. DORONICUM.

** *Invol. bracts narrow, with a few much shorter outer ones* (*calyculate*), *except* Emilia *and some* Senecios.

Heads homogamous. Style-tips long, hairy . . . . . . 76. GYNURA.
Heads homogamous, ebracteolate . . . . 77. EMILIA.
Heads homogamous. Style-tips ovate. Fleshy shrubs . . 78. NOTONIA.
Heads rayed or disciform, homogamous. Style-tips truncate or short or 0. Leaves radical or alternate . . . . 79. SENECIO.
Heads heterogamous. Fl. ☿ sterile. Glabrous undershrubs . 80. OTHONNOPSIS.

Subtribe 3. OTHONNEÆ. *Invol.-bracts* 1-seriate, united to above the middle into a cup. *Fl.* ☿ fertile; style-arms truncate.

Heads large, solitary, erect, sessile or peduncled. Alpine herbs 81. WERNERIA.

TRIBE VIII. **Calendulaceæ.** *Heads* rayed. *Invol.-bracts* 1–2-seriate, narrow, subequal. *Receptacle* naked. *Anther-cells* mucronate. *Style-arms* of ☿ fl. truncate, or in sterile fl. undivided. *Achenes* usually large and thick and deformed, without pappus. . . . .

Achenes incurved. Herbs with alternate leaves . . . . . 82. CALENDULA.

TRIBE IX. **Cynaroideæ.** *Flowers* all tubular. *Invol. bracts* many-seriate, imbricate; tips scarious, spinous or foliaceous. *Receptacle* densely bristly or paleaceous, rarely simply pitted. *Corolla-limb* slender, deeply 5-fid. *Anther-cells* tailed. *Styles* subentire, or arms short hairy or thickened towards the base. *Achenes* often hard; pappus various, rarely 0.—*Leaves* alternate, often spinous.

Subtribe 1. ECHINOPSIDEÆ. *Heads* 1-flowered, crowded into involucrate globose balls.

83. ECHINOPS.

Subtribe 2. CARDUINEÆ. *Heads* ∞-flowered, separate. *Achenes* glabrous, basal areole horizontal. *Pappus hairs* distinct or connate.

* *Filaments free, glabrous. Pappus hairs free, caducous. Leaves armed.*

Invol. bracts with hooked bristles. Leaves unarmed . . . 84. ARCTIUM.
Invol. bracts spinescent. Leaves spinescent . . . . . . 85. COUSINIA.

** *Filaments papillose-hairy. Pappus hairs connate into a deciduous ring.*

Pappus hairs simple, not feathery. . . . . 86. CARDUUS.
Pappus hairs feathery. . . . . 87. CNICUS.

*** *Filaments glabrous, connate.*

Invol. bracts spinous. Receptacle bristly. Pappus simple . 88. SILYBUM.

**** *Filaments free, glabrous (hairy in* Goniocaulon*). Leaves unarmed.*

Pappus hairs 1-seriate, feathery, with a few outer simple . . 89. SAUSSUREA.
Pappus hairs ∞-seriate, subpaleaceous. *Filaments hairy* . . 90. GONIOCAULON.
Pappus hairs ∞-seriate, rigid, rough or feathery . . . . . 91. JURINEA.

Subtribe 3. CENTAUREÆ. *Heads* separate, ∞-flowered. *Achenes* glabrous; basal areole oblique or lateral.

* *Involucre not bracteate at the base, or rarely so.*

Filaments glabrous. Anther-tails short or 0 . . . . . . 92. SERRATULA.
Filaments papillose. Anther-tails lacerate. Achenes smooth 93. TRICHOLEPIS.
Achenes terete, 10–15-ribbed . . . . 94. VOLATURELLA.
Achenes compressed or 4-angled, 4–5-ribbed . . . . . . 95. CENTAUREA.

** *Involucre bracteate at the base by spinous leaves.*

Achenes compressed or angled. Pappus paleaceous or 0 . . 96. CARTHAMUS.

TRIBE X. **Mutisiaceæ.** *Heads* hetero- or homogamous, rayed or not. *Invol. bracts* ∞-seriate, unarmed. *Receptacle* rarely paleaceous. *Corolla* 2-lipped, ligulate, or deeply 5-fid. *Anther-cells* usually tailed. *Style-arms* rounded or truncate, not appendaged. *Pappus* various.—*Leaves* rarely opposite. (See also *Nanothamnus, Tridax* and some *Senecios*.)

Subtribe 1. GOCHNATIEÆ. *Corollas* all tubular; segments narrow, equal or obscurely 2-lipped.

Pappus hairs simple. A shrub with alternate entire leaves . 97. LEUCOMERIS.
Pappus hairs feathery. Rigid shrubs . . . . 98. DICOMA.
Pappus scales 10, ending in bristles. Rigid shrubs. Heads solitary . . . . 99. HOCHSTETTERIA.
Pappus hairs feathery. Erect herbs, heads subracemose . 100. AINSLIÆA.

Subtribe 2. GERBEREÆ. *Heads* rayed. *Corolla* 2-lipped or ligulate.

Heads few-flowered; fl. all ligulate. An undershrub . . 101. CATAMIXIS.
Heads many-flowered; ray-fl. 2-lipped. Scapigerous herbs 102. GERBERA.

TRIBE XI. **Cichoriaceæ.** *Heads* homogamous. *Corollas* all ligulate; ligule truncate, tip 5-toothed. *Anther-bases* sagittate, rarely tailed. *Style-arms* slender.—Herbs, juice usually milky. *Leaves* radical or alternate, never opposite. (See also 101. *Catamixis*.)

Subtribe 1. HYOSERIDEÆ. *Achenes* truncate. *Pappus* of scales, with sometimes alternating hairs, or 0.

Rigid herbs. Fl. blue; inner invol. bracts coriaceous, concave . . . . 103. CICHORIUM.

Subtribe 2. LAPSANEÆ. *Achenes* obtuse. *Pappus* 0.

Heads small, panicled. Achenes many-ribbed . . . . 104. LAPSANA.

Subtribe 3. RHAGADIOLEÆ. *Achenes* narrowed upwards or beaked. *Pappus* short, of scales or bristles, or 0.

Achenes elongate, incurved, spinous . . . . 105. KOLPINIA.
Achenes elongate, smooth . . . . 106. RHAGADIOLUS.

Subtribe 4. CREPIDEÆ. Usually leafy herbs, not woolly nor with stellate hairs. *Involucre* calyculate, inner bracts often thickened. *Achenes* usually contracted at both ends.

Receptacle naked. Achenes ribbed, rugose; pappus hairs feathery . . . . 107. PICRIS.
Receptacle naked. Achenes ribbed; pappus hairs simple, free, white . . . . 108. CREPIS.
Receptacle naked. Achenes with slender ribs; pappus hairs copious, slender, subcrenate below . . . . . 109. PHÆCASIUM.
Receptacle bristly. Achenes 8–10-ribbed; pappus hairs simple . . . . 110. PTEROTHECA.

Subtribe 5. HIERACIEÆ. Herbs, usually perennial, more or less stellately hairy. *Achenes* truncate. *Pappus hairs* simple.

Pappus hairs rigid, bristles usually rough, brown . . . 111. HIERACIUM.

Subtribe 6. HYPOCHÆRIDEÆ. Scapigerous herbs, hairs various. *Achenes* contracted below, usually beaked above. *Pappus hairs* simple or feathery.

Receptacle paleaceous. Pappus hairs feathery . . . . 111.* HYPOCHÆRIS.
Receptacle naked. Pappus hairs simple . . . . 112. TARAXACUM.

Subtribe 7. LACTUCEÆ. Herbs, rarely shrubby below, glabrous or hispid, rarely scapigerous. *Achenes* usually narrowed below, and beaked or not above. *Pappus hairs* many, simple.

Achenes subterete, beaked, toothed below the beak . . . 113. CHONDRILLA.
Achenes compressed, beaked, ribs smooth . . . . . . 114. LACTUCA.
Achenes subterete, 3–5-angled, not beaked . . . . . . 115. PRENANTHES.
Achenes oblong, not beaked, with 4–5 rugose ribs . . . 116. PICRIDIUM.
Achenes compressed, not beaked, many-ribbed, ribs smooth or rough . . . . 117. SONCHUS.
Achenes narrow, truncate at both ends, 4–5-ribbed . . . 118. LAUNÆA.

Subtribe 8. SCORZONEREÆ. Herbs, glabrous, woolly or hispid. *Achenes* with a broad base, or curved hollow stipes, above narrowed or beaked.

Invol. bracts 1-seriate. Achenes long-beaked . . . . . 119. TRAGOPOGON.
Invol. bracts ∞-seriate, outer not leafy. Achenes not beaked 120. SCORZONERA.
Outer invol. bracts leafy. Achenes not beaked . . . . 121. EPILASIA.

TRIBE I. **VERNONIEÆ.**

1. **ETHULIA,** *Linn.*

Branched herbs. *Leaves* alternate, serrate. *Heads* small, corymbose, homogamous. *Invol.* subcampanulate; bracts ∞-seriate, imbricate. *Receptacle* flat, naked. *Corollas* all tubular, equal, regular, slender; limb campanulate; lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* glandular between the 4–6 prominent ribs; areole broad with a callous ring; pappus 0.—DISTRIB. Species 2, a Javan and the following.

1. **E. conyzoides,** *Linn.*; *DC. Prodr.* v. 12; heads $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Bot. Reg.* t. 695; *Wall. Cat.* 3196; *Clarke Comp. Ind.* 1. E. ramosa, *Roxb. Fl. Ind.* iii. 413; *Wall. Cat.* 2987. E. gracilis, *Delile*; *DC. l. c.* E. angustifolia, *Bojer*; *DC. l. c.*

EASTERN BENGAL, ASSAM, and SILHET.—DISTRIB. Sunda Archipelago and Java? E. Tropical Africa, Madagascar.

An erect glabrous or puberulous leafy annual. *Leaves* 2–5 in., narrowly or broadly elliptic-lanceolate, acuminate, narrowed and entire at the base, glandular-dotted; serratures coarse, distant. *Heads* very numerous; peduncles short or long; flowers purplish or reddish.—African specimens are usually more slender and pubescent.

2. CENTRATHERUM, *Cass.*

Erect or diffusely branched herbs. *Leaves* alternate, petioled, toothed. *Heads* homogamous. *Invol.* subhemispheric; bracts ∞-seriate, inner dry or scarious, outer herbaceous often leafy. *Receptacle* flat, naked or pitted. *Corollas* all tubular, equal, slender; limb campanulate, lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* obtuse, 8–10-ribbed; pappus short, scabrid, fugacious.—DISTRIB. Species about 10 Asiatic, with 2 American and an Australian.

* Leaves white beneath. Outer invol. bracts large, often leafy.

† *Pappus yellowish.*

1. **C. reticulatum,** *Benth. in Gen. Pl.* ii. 225; robust, scabridly tomentose, leaves sessile ovate or oblong base acute or cordate scabrid above pale tomentose beneath, nerves reticulate, pappus equalling the corolla-tube. *Clarke Comp. Ind.* 2. Decaneuron reticulatum, *DC. in Wight. Contrib.* 3; *Prodr.* v. 66; *Mem. Comp.* t. 1. Rolfinkia centaurioides, *Zenk. Pl. Ind.* t. 14. Amphiraphis indica, *Less. in Linnæa*, vi. 686; *Wall. Cat.* 2956. Gymnanthemum reticulatum, *Schultz-Bip. in Walp. Rep.* ii. 948.

WESTERN PENINSULA; Nilgherry and Pulney Mts., alt. 5–7000 ft., *Wight*, &c.

Stem 2–3 ft., stout, erect, branched. *Leaves* 2–3$\frac{1}{2}$ in., rigid, dirty white beneath; nerves elevated, much reticulated; margins narrowly recurved. *Heads* subsolitary, 1–1$\frac{1}{2}$ in. diam.; inner bracts broad, acute, pubescent, outermost leafy but short. *Achenes* $\frac{1}{10}$ in. long.

2. **C. molle,** *Benth. in Gen. Pl.* ii. 225; branches and invol. bracts pubescent and with white wool, leaves petioled elliptic-ovate or -lanceolate coarsely toothed hairy above white-tomentose beneath, pappus very short. Decaneuron molle, *DC. Prodr.* v. 67; *Wight Ic.* t. 1082. D. Epilejum *and* D. scabridum, *DC. in Wight Contrib.* 7. Diospermum molle, *Deless. Ic. Sel.* iv. t. 2. Amphiraphis mollis, *Wall. Cat.* 2957.

WESTERN PENINSULA; Courtallam, *Wight.*

Annual, erect, branched, 1–2 ft. *Leaves* 3–6 by 1–2$\frac{1}{2}$ in., rather membranous, narrowed portion quite entire. *Heads* $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; outer invol. bracts, if leafy, usually shorter than the head; inner often spreading or reflexed. *Corolla* $\frac{1}{4}$ in. *Achenes* $\frac{1}{14}$–$\frac{1}{12}$ in., linear-oblong, smooth, glabrous; pappus very short.—*D. scabridum*, Wight Herb. n. 1392, differs not at all from *C. molle*; his n. 1532, quoted by Clarke under var. *scabridum* is *C. courtallense.*

3. **C. courtallense,** *Benth. in Gen. Pl.* ii. 225 (*not of Clarke*); branches and invol. bracts coarsely hairy, leaves petioled elliptic-ovate or lanceolate entire or toothed, pappus very short. Decaneuron courtallense, *Wt. Ic.* t. 1081; *Steetz in Peters Mosamb. Bot.* 353. D. molle, var. *Herb. Wt.* (Kew Distrib. 1532).

WESTERN PENINSULA; Courtallam and Anamallay hills, *Wight*; Canara, *Hohenacker.*

Very near *C. molle*, but distinguished by the often quite entire leaves, usually

larger stouter peduncles, broader shorter and more regular invol. bracts, and especially by the coarse hairs of the peduncles and involucre. The achenes are the same in both.

†† *Pappus reddish.*

4. **C. Ritchiei,** *Hook. f.*; branches glabrate, leaves petioled elliptic or elliptic-lanceolate toothed white-tomentose beneath, outer invol. bracts leafy base cordate, pappus equalling the corolla-tube. Gymnanthemum molle, *Schultz-Bip. in Pl. Hohenack.* n. 93, *a.*

The CONCAN and CANARA, *Stocks, Ritchie,* &c.

A more slender annual than *C. molle,* and at once distinguished by its glabrate often shining branches, the 2–6 or more large leafy oblong cordate outer invol. bracts, and the longer pappus. *Heads* $\frac{1}{3}$ to nearly $\frac{1}{2}$ in. diam. *Achenes* very small, about $\frac{1}{18}$ in.

5. **C. phyllolænum,** *Benth. in Gen. Pl.* ii. 225; branches glabrate pubescent or substrigose, leaves elliptic toothed or serrate white-tomentose beneath, outer involucral leafy bracts several base contracted, pappus equalling the corolla-tube. Decaneuron phyllolænum, *DC. Prodr.* vii. 264. Gymnanthemum phyllolænum, *Schultz-Bip. in Pl. Hohenack.* n. 274. D. molle, *Dalz. & Gibs. Bomb. Fl.* 122.

The CONCAN, *Roux, Law, Jacquemont,* &c. MARWAR, on Mt. Aboo, *King.*

Very variable, annual, stout or slender; branches usually spreading. *Leaves* 2–5 in., usually elliptic, petioled, sometimes hardly white beneath. *Heads* $\frac{1}{2}$–1 in. diam.; peduncles usually slender; outer invol. bracts 1–∞, spreading or deflexed, linear or lanceolate, rarely oblong, sometimes much longer than the heads, white beneath; middle bracts extremely variable, obtuse, acute or rounded, green or scarious at the tip, erect or recurved, margins ciliate or not. *Achenes* $\frac{1}{10}$ in.; pappus reddish or almost white.

6. **C. tenue,** *Clarke Comp. Ind.* 5; branches slender glabrous, leaves elliptic sparingly toothed, heads small, peduncles very slender, invol. bracts glabrous outer 1 or 2 elongate linear or oblong, pappus much shorter than the corolla-tube.

WESTERN PENINSULA; the Concan, *Gibson, Law,* &c.

Closely allied to *C. phyllolænum,* but much more slender, with always small heads $\frac{1}{3}$–$\frac{1}{2}$ in. diam., and only 1 or 2 leafy invol. bracts, much shorter pappus, and more turgid achenes only $\frac{1}{16}$ in. long.

** Leaves not white beneath. Outer invol. bracts shortest.

7. **C. Hookeri,** *Clarke Comp. Ind.* 3; pubescent, branches angled and grooved, leaves linear-lanceolate obscurely toothed, pappus long. Decaneuron angustifolium, *Herb. Ind. Or. Hook. f. & T.*

The CONCAN, *Law, Stocks.*

Annual, erect, 18–24 in., stiff, branched above. *Leaves* scattered, 2–3 by $\frac{1}{4}$–$\frac{1}{2}$ in., and, as well as the branches, brownish when dry and puberulous on both surfaces. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; peduncles slender, hoary-pubescent; bracts numerous, small, none leafy. *Corolla* $\frac{1}{3}$ in. long, red. *Pappus* single, equalling the corolla. *Achenes* $\frac{1}{10}$ in., linear-oblong.

IMPERFECTLY KNOWN SPECIES.

C. METZIANUM (*Diospermum Metzianum,* Schultz. Bip. in Herb. Hohenack. from Canara) resembles *C. molle,* but has the hairy invol. bracts of *C. courtallense* and no pappus. The specimen is a very indifferent one.

3. LAMPRACHÆNIUM, *Bth.*

An erect branched annual smelling of chamomile, with crisped hairs. *Leaves* alternate, petioled, toothed. *Heads* small, subcorymbosely panicled, homogamous. *Involucre* subcampanulate; bracts ∞-seriate, dry, inner acute. *Receptacle*

flat, naked. *Corollas* all tubular, equal, slender; lobes 5, narrow. *Anthers* obtusely auricled. *Style-arms* subulate. *Achenes* obovoid, turgid, a little compressed, smooth, shining; pappus hairs few, short, fugacious, red.

1. **L. microcephalum,** *Benth. in Gen. Plant.* ii. 225. Decaneuron microcephalum, *Dalz. in Hook. Kew Journ.* iii. 231; *Dalz. & Gibs. Bomb. Fl.* 122; *Clarke Comp. Ind.* 5.

The CONCAN; at Parwar Ghat, Bombay, *Gibson, Dalzell.*

Habit, pubescence and foliage of *Centratherum tenue.* *Stem* 1–2 ft., simple or branched from the base, glabrous hairy or glandular. *Leaves* petioled, 2–4 in., hairy above, white-tomentose beneath. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; peduncles slender, hispid or glabrate; invol. bracts acute, ciliate, none leafy, erect or recurved. *Achenes* $\frac{1}{12}$ in.; pappus reddish, equalling the corolla-tube.

4. ADENOON, *Dalz.*

An erect rigid herb. *Leaves* alternate, sessile. *Heads* corymbosely panicled, homogamous. *Involucre* campanulate; bracts many-seriate, coriaceous, oblong-lanceolate, aristate, outer gradually shorter. *Receptacle* flat, minutely fimbriate. *Corollas* all tubular, equal, slender; limb narrow, 5-cleft. *Anther-bases* sagittate. *Style-arms* subulate, hairy. *Achenes* obovoid, obtuse, subcompressed, 10-ribbed; pappus 0.

1. **A. indicum,** *Dalz. in Hook. Kew Journ.* ii. 344; *Dalz. & Gibs. Bomb. Fl.* 121; *Steetz. in Peters Mosamb. Bot.* 352; *Clarke Comp. Ind.* 5. Ethulia sp. v. Gen. nov. *Grah. Cat. Bomb. Pl.* 101.

The CONCAN; Parwar Ghat, Bombay, *Ritchie, Law,* &c.; Belgaum, *Law.*

A rather stout erect hairy or hispid annual, 2–3 ft.; stem angled and grooved, branched above. *Leaves* shortly petioled, 1–4 in., broadly ovate obovate or almost orbicular, coarsely unequally toothed, hairy on both surfaces. *Heads* $\frac{2}{3}$ in. diam., sessile and peduncled; peduncles stout or slender, hispid or tomentose; bracts at the forks subulate; corolla $\frac{1}{2}$ in.; limb as long as the tube. *Achenes* $\frac{1}{12}$ in., glandular; ribs very stout.

5. VERNONIA, *Schreb.*

Herbs, shrubs, climbers or small trees. *Leaves* alternate. *Heads* terminal or axillary, solitary cymose or panicled, homogamous. *Involucre* ovoid globose or hemispheric, equalling or shorter than the flowers; bracts in many series, inner longest. *Receptacle* naked or pitted, sometimes shortly hairy. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse. *Style-arms* subulate. *Achenes* striate ribbed or angled, rarely terete; pappus of many hairs, often girt with a row of outer short hairs or flattened bristles.—DISTRIB. About 380 species, chiefly tropical, and mostly American.

I have found it impossible to classify the Indian Vernonias under the commonly recognised sections of the genus as defined in the "Genera Plantarum," and have had recourse to what appear to me to be more natural divisional characters, but they are extremely vague. The species are most difficult to limit and define, the involucral bracts being especially variable.

A. *Invol. bracts* all or the outermost subulate or lanceolate, often aristate (inner linear and obtuse in *V. Helferi* and *peguensis*, outer ovate acute).

* *Heads* $\frac{1}{2}$–1 *in. diam., rarely less, few, in open terminal or lateral corymbs or panicles, or solitary and axillary.*

1. **V. teres,** *Wall. Cat.* 2926; rigid, scabrid, leaves hard subsessile obovate or obovate- or elliptic- or oblong-lanceolate acute subserrate heads 30–50-

flowered large solitary and axillary or few and terminal subsessile, invol. bracts very many long subulate-lanceolate subsquarrose, achenes silky, pappus yellowish or reddish. *DC. Prodr.* v. 15; *Clarke Comp. Ind.* 16. V. riparia, *Wall. Cat.* 2925. V. rigiophylla, *DC. l. c.* 15. V. squarrosa, *Less. in Linnæa*, 1831, 627. Eupatorium rigidum, *Wall. Cat.* 2925. Acilepis squarrosa, *Don Prodr.* 169.

TROPICAL HIMALAYA, from Kumaon, alt. 5000 ft., to Sikkim. BEHAR, CENTRAL INDIA, PEGU and BIRMA, in dry forests.

Stem simple, terete, erect, leafy, pubescent or tomentose with brown hairs. *Leaves* 2-5 by 1-2 in., base acute rounded or cordate, usually scabrid on both surfaces, reticulate beneath. *Heads* ¾ 1 in. diam.; inner invol. bracts nearly ½ in., sparsely woolly, outer small, often squarrose; corolla glabrous. *Achenes* ⅙ in.; pappus ⅓ in., outer hairs few, short, caducous.

2. **V. subsessilis,** *DC. Prodr.* v. 62; shrubby, branches nerves beneath and corymbs pubescent or tomentose, leaves large sessile oblanceolate or obovate acute or acuminate toothed serrate or sinuate-crenate glabrous above, heads many ⅔ in. diam. 30-40-flowered corymbose or panicled, invol. bracts very many elongate-subulate or acicular strict, achenes silky, pappus reddish.

NIPAL, *Wallich.* KHASIA MTS., ASSAM and BIRMA, *Griffith*, &c.

Stout, shrubby. *Leaves* 4 12 by 1-4 in., glabrous above. *Heads* 40 50-flowered, ¾ in. diam., branches of corymb sometimes woolly, bracts at the forks slender. *Invol.* obconic; bracts spreading from the base, outer subulate, very narrow, rigid, pubescent sometimes recurved; corolla glabrous. *Achenes* ⅛ in., striate; pappus nearly ½ in., persistent, outer very short, unequal.—There are three forms of this.

VAR. 1. *subsessilis* proper; leaves narrowly lanceolate sharply irregularly toothed or serrate acuminate, heads corymbose, peduncle naked or with solitary subulate bracts. Conyza subsessilis, *Wall. Cat.* 300.—Khasia Mts., alt. 500-2000 ft.

VAR. 2 *bracteolata*; more shrubby, leaves obovate-lanceolate acuminate obscurely sinuate-toothed, heads corymbose, peduncles with often many subulate bracts. V. bracteolata, *DC. Prodr.* v. 62. Conyza bracteolata, *Wall. Cat.* 3036.—Nipal, Khasia Mts., Assam and Birma.

VAR. 3. *macrophylla*; shrubby, leaves 10 12 by 3-3½ in. obovate acute coarsely crenate-toothed, heads panicled, peduncles with filiform bracts.—East Nipal, dry rocks on the Tambur river, *J. D. H.*

3. **V. malabarica,** *Hook. f.*; branches and leaves beneath softly tomentose, leaves shortly petioled elliptic-lanceolate serrulate acuminate puberulous above, heads few ½ in. diam. terminal corymbose, invol. bracts few suberect linear-subulate pubescent, achenes obtusely 5-angled glabrate equalling the invol. bracts, pappus yellowish.

NILGHERRY MTS.; Sisparah Ghat, *Beddome.*

Apparently shrubby; branches strict, pubescence of very soft, pale brown, close-set hairs. *Leaves* 2½-3 by ¾ 1 in., rather thin. *Heads* all peduncled; corolla-lobes glandular-pubescent. *Achenes* ⅙ in.; pappus ¼ in., outer very distinct, short, paleaceous.

4. **V. Gardneri,** *Thw. Enum.* 160, *excl. var.* β; herbaceous, branches leaves beneath and inflorescence puberulous, leaves petioled elliptic-lanceolate finely acuminate acutely serrate, nerves not prominent above, invol. bracts narrow subulate finely acuminate, achenes puberulous, pappus pale reddish. *Clarke Comp. Ind.* 11.

CEYLON, Central Province; Adam's Peak, *Walker*; Ambagamowa, *Thwaites.*

Stem and branches slender. *Leaves* usually 4-5 by ⅓ ⅔ in., rarely 5 6 by 2 2½, rather membranous, teeth gland-tipped. *Heads* ½-¾ in.; peduncles slender; outermost invol. bracts somewhat spreading; corolla glabrous. *Pappus* ⅓ in., outer very short.

5. **V. Thwaitesii,** *Clarke Comp. Ind.* 11; branches and corymbs finely pubescent, leaves sessile ovate or elliptic-ovate acute acutely serrate rigidly coriaceous reticulated, nerves prominent on both surfaces, invol. bracts linear-oblong obtuse or acute, achenes puberulous, pappus pale reddish. V. Gardneri, β, *Thwaites Enum.*, 161.

CEYLON, Central Province; Adam's Peak, Horton Plains, and Galagama, *Walker*, &c.

Branches slender, rigid. *Leaves* 2–2½ by ⅔–1½ in., narrowed at the base, rarely almost orbicular, puberulous beneath, tip and teeth almost pungent. *Heads* few, hardly corymbose; peduncles often very long; outermost invol. bracts very short, subulate; corolla glabrous. *Pappus* ⅓ in., outer very short.

6. **V. Beddomei,** *Hook. f.*; glabrous, much branched, upper leaves shortly petioled lanceolate caudate-acuminate coarsely serrate those on the slender peduncles narrow and recurved, invol. bracts linear acuminate, achenes hairy, pappus white.

WESTERN PENINSULA; South Travancore, *Beddome.*

Branches ribbed, slender. *Leaves* (lower not seen) 4–6 by 1–1¼ in., rather rigid, reticulated on both surfaces, long apex quite entire. *Heads* 1–1¼ in. diam., few or in much branched corymbs; branches and peduncles very slender; outer invol. bracts very short, subulate. *Pappus* ½ in.; outer hairs few, short.

7. **V. attenuata,** *DC. Prodr.* v. 33; rigid, branches leaves beneath and inflorescence puberulous, leaves hard sessile obovate or oblong-obovate acute coarsely toothed or serrate reticulate on both surfaces, invol. bracts linear-lanceolate finely acuminate outermost subulate, achenes striate villous, pappus white. *Kurz in Journ. As. Soc.* 1877, ii. 201; *Clarke Comp. Ind.* 12. Conyza attenuata, *Wall. Cat.* 3020.

EASTERN HIMALAYA and ASSAM, in dry tropical forests; alt. 1–5000 ft. TENASSERIM, *Wallich, Falconer*, &c.

Erect, 2–3 ft., slender, branches grooved. *Leaves* very variable, 3–5 by 1–2½ in. *Heads* panicled corymbose, or solitary and axillary, when they are sometimes sessile, ½–¾ in. diam.; peduncles short, slender, often divaricate; inner invol. bracts nearly ⅓ in.; corolla glabrous. *Achenes* $\frac{1}{10}$ in.; pappus ¼ in., persistent, outer hairs few short. —A Siam form (*V. juncea*, Kurz) has heads sessile on long slender leafless branches, and rufous pappus.

8. **V. Helferi,** *Hook. f.*; nearly glabrous, stem simple slender, leaves sessile elliptic acute entire or serrate shining and minutely reticulate on both surfaces, heads 1–2 30–40-flowered, invol. bracts linear-oblong obtuse outermost ovate acute, achenes silky 10-ribbed, pappus white.

TENASSERIM, *Helfer.*

Stem 6–10 in., erect, above and peduncles pubescent, rather flexuous. *Leaves* 1½–2 by ½–1 in., thinly coriaceous, brown and shining when dry. *Heads* shortly peduncled, ½ in. diam.; invol. bracts glabrous, not numerous, innermost less than ⅙ in., flat; corolla glabrous. *Achenes* ⅛ in.; pappus ¼ in., outer hairs numerous short flattened. —This has altogether the habit of *V. attenuata*, to which it is indeed closely allied, differing chiefly in its slender habit and the linear obtuse invol. scales.

9. **V. Lobbii,** *Hook. f.*; corymbs softly tomentose, leaves shortly petioled broadly obovate subacute obscurely toothed glabrous above with raised dots beneath with fine lax hairs, heads sessile in axillary and terminal fascicled corymbs very shortly peduncled, invol. bracts linear aristate scarious outermost subulate, achenes villous, pappus white.

TENASSERIM; hills on the Attran, *Lobb.*

Leaves 6–7 by 3–3½ in., rather rigid, narrowed to the base but not into the short

stout petiole, finely reticulate on both surfaces, those on the inflorescence linear-oblong. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., clothed with white woolly tomentum; invol. bracts $\frac{1}{5}$ in., white. *Achenes* (unripe) $\frac{1}{16}$ in.; pappus $\frac{1}{4}$ in.; hairs slender, persistent, outer very short.

10. **V. clivorum,** *Hance in Seem. Journ. Bot.* 1869, 164; branches leaves beneath and inflorescence puberulous, leaves shortly petioled lanceolate acuminate distantly serrate reticulate beneath, heads small corymbose on short lateral branches, invol. bracts linear acute outermost subulate, achenes pubescent, pappus white. V. Kingii, *Clarke Comp. Ind.* 12.

PEGU and MARTABAN, *Kurz.* UPPER BIRMA, *J. Anderson.*—DISTRIB. Canton.

Branches grooved and ribbed. *Leaves* 3–5 by $\frac{3}{4}$–2 in., tip entire, base rounded, rather rigid. *Heads* $\frac{1}{4}$ in. diam., 15–20-flowered; peduncles slender; outer invol. bracts short, subulate; corolla glabrous. *Pappus* $\frac{1}{4}$ in.; hairs slender, persistent, outer few, very short.—I have seen only Hance's Canton specimen, to which Clarke refers his *V. Kingii*: the achenes are immature.

11. **V. peguensis,** *Clarke Comp. Ind.* 13; branches and corymbs finely pubescent, leaves petioled oblanceolate or linear-lanceolate acute or acuminate serrate glabrate on both surfaces, heads in simple axillary and terminal branched panicled corymbs, invol. bracts few lanceolate aristate-acuminate inner linear-oblong obtuse or acute, outermost ovate minute, achenes slightly hairy, pappus white.

PEGU; Irawaddy and Saluen valleys, *Kurz.*

Apparently a robust tall species. *Leaves* 12 by 4 to 6 by 1 in., rather membranous, puberulous when young, narrowed into the petiole. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in., 12–20-flowered; inner invol. bracts $\frac{1}{4}$ in., membranous, green. *Achenes* (immature) $\frac{1}{8}$ in.; pappus hairs fine, persistent, outer many, very short, rigid.

12. **V. Thomsoni,** *Hook. f.*; half-shrubby, much branched, branches corymbs and leaves above scaberulous, leaves subsessile lanceolate acuminate serrate puberulous beneath, heads obconic 10–15-flowered in small short axillary corymbs, peduncles slender, invol. inner bracts linear acuminate outermost needle-shaped, achenes glabrous strongly 10-ribbed, pappus white.

CHITTAGONG; at Seetakoond, *J. D. H. & T. Thomson.*

A straggling undershrub; branches ribbed and grooved. *Leaves* 4–8 by $1\frac{1}{2}$–3 in., membranous. *Heads* on slender pubescent pedicels, $\frac{1}{2}$ in. diam.; invol. bracts glabrous, shining, recurved, inner $\frac{3}{4}$ in. *Achenes* $\frac{1}{8}$ in.; pappus $\frac{1}{3}$ in., very fine, persistent, outer hairs very few.—This is probably the Seetakoond plant which Kurz includes under *V. saligna*, from which it widely differs in the larger heads and much longer narrower white invol. bracts.

13. **V. bracteata,** *Wall. Cat.* 2921; rigid, scabrid or scaberulous, leaves sessile or shortly petioled elliptic or elliptic-lanceolate acute remotely serrate, heads 30-flowered few large corymbose peduncled, invol. bracts not numerous linear-oblong with slender often recurved awns, outermost subulate, achenes glabrous, pappus reddish. *Clarke Comp. Ind.* 17 *excl. syn. Wight.* Decaneuron silhetense, *DC. Prodr.* v. 67. Xipholepis silhetensis, *Steetz in Peter's Mosamb. Bot.* 345?

EASTERN HIMALAYA; Sikkim and Bhotan. KHASIA MTS., alt. 2–6000 ft. BIRMA; Karen hills, *Kurz.*

Shrubby below, erect, sparingly branched, leafy; branches terete, pubescent or roughly tomentose. *Leaves* usually narrow, 2–4 by $\frac{1}{2}$–1 in., rarely 4 by 2 in., more or less rigid and scabrid. *Heads* rarely many, $\frac{3}{4}$ in. diam.; peduncles erect or ascending, scabrid; invol. bracts few, inner often $\frac{1}{3}$ in., thin, glabrate. *Corolla* glabrous. *Achenes* quite glabrous; otherwise and pappus as in *V. Roxburghii* and *teres.*

14. **V. Roxburghii,** *Less. in Linnæa*, 1831, 674; rigid, scabrid, leaves hard subsessile or petioled elliptic- or obovate-lanceolate acuminate acutely

serrate, heads 30-flowered large fascicled in terminal panicled corymbs, invol. bracts linear obtuse and apiculate or acuminate or pungent outermost subulate, achenes sparsely hairy, pappus dirty white or reddish. *Kurz in Journ. As. Soc.* 1877, ii. 200. V. aspera, *DC. Prodr.* v. 31, *not of Ham.*; *Wall. Cat.* 2922, *excl.* A.; *Clarke Comp. Ind.* 17. Eupatorium asperum, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415. E. pyramidale, *Don Prodr.* 170. Xipholepis aspera, *Steetz in Peters Mosamb. Bot.* 345? *excl. syn.*

WESTERN HIMALAYA; Kumaon, *Royle, Edgeworth.* CHOTA-NAGPORE, and CENTRAL INDIA, alt. 1–4000 ft. BEHAR, *J. D. H.* CONCAN, *Law* (perhaps cult.); BIRMA, at Bhamo, on dry hills, *Griffith.*

More branched than *V. teres*; leaves often narrowed into a slender petiole, acuminate and deeply serrate; heads smaller, very numerous; invol. bracts fewer and broader, inner $\frac{1}{3}$ in., quite linear; achenes as large, less hairy and only between the ribs; outer pappus hairs often absent.

15. **V. peninsularis,** *Clarke mss.*; roughly pubescent, stem flexuous ribbed, leaves petioled elliptic acute serrate, heads 20–30-flowered few corymbose, invol. bracts oblong with very long slender often recurved awns outer filiform squarrose, achenes glabrous, pappus pale reddish. V. bracteata, var. peninsularis, *Clarke Comp. Ind.* 18. Decaneuron silhetense, *Wt. Ic.* t. 1083.

TRAVANCORE, at Courtallam, *Wight.*

Stem nearly simple, deeply furrowed. *Leaves* 2–4 by $1\frac{1}{2}$–2 in., rather membranous, scabrid above. *Heads* $\frac{3}{4}$ in. diam.; outer invol. bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; awns often as long as the lamina, woolly. *Achenes* and *pappus* as in *V. bracteata.*

16. **V. anceps,** *Clarke mss.*; shrubby, branches slender terete and corymbs brown-pubescent, leaves petioled lanceolate or narrowly elliptic-lanceolate acuminate distantly serrulate puberulous on both surfaces or beneath only, heads 30–40-flowered in open corymbs, inner invol. bracts short oblong-lanceolate acute outer subulate, achenes strongly 4–5-ribbed puberulous, pappus dirty white, outer a ring of short paleaceous scales. V. Wightiana, var. β, *Thwaites Enum.* 160.

CEYLON; Adam's Peak, *Thwaites.*

Branches woody, as thick as a crow- or goose-quill. *Leaves* 2–3 by $\frac{1}{4}$–$\frac{3}{4}$ in. *Achenes* $\frac{1}{10}$ in., twice as long as the invol. bracts.—This, Thwaites, considering the close similarity of their floral characters, does not venture to separate from *V. Wightiana*; but the foliage, &c., is so entirely different in form, membranous consistence, toothing, and glabrousness, that I cannot but agree with Mr. Clarke in keeping it distinct; the corollas are nearly glabrous.

17. **V. revoluta,** *Ham. in Trans. Linn. Soc.* xiv. 218; dwarf, puberulous, leaves sessile linear apiculate margins revolute, heads 30–40-flowered subsolitary, invol. bracts few broadly oblong-lanceolate acuminate, achenes hairy terete, pappus white. *Clarke Comp. Ind.* 22. V. oligocephala, *Edgew. in Trans. Linn. Soc.* xx. 63.

WESTERN HIMALAYA; Kumaon and Garwhal, *Royle, Falconer,* &c. BHOTAN, *Griffith.*

A perennial woody-rooted herb, branched from the base; stems 2–6 in., ascending or erect, slender, angled and grooved. *Leaves* erect, 1 by $\frac{1}{10}$–$\frac{1}{6}$ in., with a strong midrib and strongly revolute entire margins. *Heads* $\frac{1}{2}$ in. diam.; peduncles striate; bracts subulate or 0; invol. bracts puberulous; outermost very narrow, subulate, often recurved; inner $\frac{1}{3}$ in. long, scarious; corolla-lobes hairy. *Achenes* (unripe) $\frac{1}{8}$ in., sparingly hairy; pappus $\frac{1}{3}$ in. long, persistent, outer hairs 0.

** *Heads small, about $\frac{1}{4}$ in. long, numerous or few, corymbose.*

† *Annual; achenes terete, not angled or ribbed.*

18. **V. cinerea,** *Less. in Linnæa,* iv. 291, and vi. 673; herbaceous, hoary-

pubescent, leaves petioled ovate or lanceolate obtuse or acute obscurely or deeply obtusely or acutely toothed, heads about 20-flowered in loose corymbs, invol. bracts linear-lanceolate tips awned glabrous, pappus white or dirty white outer hairs short. *DC. in Wight Contrib.* 6; *Prodr.* v. 24; *Wall. Cat.* 3008. V. conyzoides, *DC. in Wight Contrib.* 6; *Prodr.* v. 25; *Dalz. & Gibs. Bomb. Fl.* 121. V. rhomboidea *and* montana, *Edgew. in Trans. Linn. Soc.* xx. 62. V. albicans, *DC. in Wight Contrib.* 6, *in part*; *Wight Ic.* t. 1076 (achenes wrongly figured as 5-ribbed). V. abbreviata *and* leptophylla, *DC. l. c.* 25. V. laxiflora, *Less. in Linnæa*, vi. 646; *DC. l. c.* 25. V. physalifolia, *DC. in Wight Contrib.* 6; *Prodr. l. c.* 24. V. parviflora, linifolia, *and* fasciculata, *Reinw. in Bl. Bijd.* 893. V. Zollingeriana, *Schultz-Bip. in Miq. Fl. Ind. Bat.* ii. 16. V. cyanonioides, *Walp. in Linnæa*, xv. 509. Conyza abbreviata, *Wall. Cat.* 3048; bellidifolia, 3047; cinerascens, 3062; incana, 3046; linifolia, 3063; elegantula, 3049; ovata, 3097; *and* subsimplex, 3003. C. cinerea, *Linn.*; *Wall. Cat.* 3008. C. mollis, *Willd.* (*fid. Lessing*). C. prolifera *and* heterophylla, *Lamk. Encycl.* ii. 84. Serratula cinerea, *Roxb. Hort. Beng.* 60. Cacalia rotundifolia, *Willd. Phyt.* ii. t. 6, f. 1. Chrysocoma purpurea, *Forst. Prodr.* 54. C. violacea, *Schum. Pl. Guin.* 384. Cyanopis decurrens, *Zoll. in Geneesk. Archiv.* ii. 563; and Chlaotrachelus rupestris, *Zoll. l. c. fid. Miquel.* Synanthera, *Wall. Cat.* 7137.—*Rheede Hort. Mal.* x. t. 64.

Throughout INDIA, ascending to 8000 ft. in the Himalaya, Khasia and Peninsular Mts.—DISTRIB. Trop. Asia, Africa, and Australia.

One of the commonest Indian weeds, erect, rarely decumbent, 6–18 in. high; stem slender, grooved and ribbed. *Leaves* rarely 3 in. long or 1½ in. broad, membranous or rather coriaceous; petiole very variable. *Heads* about ¼ in. diam., in rounded or open and flat-topped corymbs; branches usually divaricate; peduncles slender, with small bracts at the axils; invol. scales about $\frac{1}{6}$–$\frac{1}{5}$ in.; corolla with pubescent lobes. *Achenes* $\frac{1}{20}$ in.; pappus $\frac{1}{6}$ in., outer hairs very short indeed. It is impossible to define the forms of habit and foliage of this very variable plant, which is on the whole remarkably uniform in its flowers; of these the most marked are *V. physalifolia*, which is stout, very tomentose, with broad leaves; and *V. conyzoides*, with short or no outer pappus, and ovate-lanceolate or ovate sharply toothed leaves narrowed into long petioles. To these may be added var. *montana*, Clarke (Comp. Ind. 21), from 4–6000 ft. on the Khasia Mts., and from the N. W. Himalaya, with villous fulvous leaves and stems and yellowish pappus, and which is Edgeworth's *V. rhomboidea*; and the var. *ludens*, Clarke l. c., with dimorphic achenes, of which the inner are normal, the outer almost beaked and seedless; it is a native of Assam, the Malay Peninsula, and China. To the many synonyms cited, Bentham (Fl. Austral. iii. 459) adds *V. erigeroides*, DC. Prodr. v. 25, and suggests that nearly all the species of DC.'s section *Tephrodes* may follow.

†† *Perennial, rarely annual; achenes ribbed.*

19. **V. divergens,** *Benth. in Gen. Pl.* ii. 229; stout, erect, pubescent tomentose or scabrid, leaves petioled elliptic-ovate or lanceolate serrate, heads small 8–12-flowered in usually dense much branched panicled rounded corymbs, invol. bracts few oblong obtuse outermost ovate, achenes glabrous 10-ribbed, pappus pale reddish-brown or dirty white. *Clarke Comp. Ind.* 14. V. aspera, *Hamilt. in Trans. Linn. Soc.* xiv. 219, *in part*; *Kurz in Journ. As. Soc.* 1877, ii. 201. V. nilgheryensis, *DC. Prodr.* v. 32; *Wt. Ic.* t. 1078. V. multiflora, *DC. l. c.* 31. V. Metziana, *Schultz-Bip. in Herb. Hohenack.* n. 1342. V. aspera, *Less. in Linnæa*, 1831, 643? Decaneuron divergens, *DC. l. c.* 68; *Wight Contrib.* 8; *Ic.* t. 1084. Conyza divergens, multiflora, *and* lanceolata, *Wall. Cat.* 3027, A., 3032 *a.*, 3059. Eupatorium versicolor *and* polyanthemum, *Wall. Cat.* 3167, 3171. E. divergens, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415. Gymnanthemum Metzianum, *Schultz-Bip. l. c.* n. 542. Lysistemma divergens *and* multiflorum, *Steetz in Peters Mosamb. Bot.* 341.

Behar, on Parusnath, alt. 4000 ft. Central India, and from the Concan to the Travancor Mts., Rangoon, Birma, and Tenasserim.

Stem shrubby, 4–8 ft. *Leaves* 2–5 by 1–4 in., varying much in texture; nerves spreading, reticulate beneath. *Heads* $\frac{1}{4}$ in. diam., usually clustered; peduncles very short; invol. bracts with greenish tips; corolla glabrous. *Achenes* $\frac{1}{12}$ in.; pappus $\frac{1}{6}$–$\frac{1}{4}$ in., hairs scabrid, outer very few or 0.—This cannot be the plant described by Hamilton as *V. aspera* (as supposed by Kurz), for that is stated to have a short outer pappus, and to be Roxburgh's *Eupatorium asperum*; as, however, Wallich's 3032 B. (under *Conyza multiflora*) is an authentic specimen of Hamilton's *V. aspera*, and so named, it is probable that this author had two plants under his eye.

20. **V. chinensis,** *Less. in Linnæa*, vi. 674; puberulous or tomentose, branches slender terete, leaves sessile or petioled ovate elliptic or elliptic-lanceolate subserrate, heads 20–30-flowered scattered or 2–3-nate, invol. bracts pubescent lanceolate awned, achenes 4–5-ribbed glabrous glandular, pappus white. *Clarke Comp. Ind.* 18. V. albicans, *DC. in Wight Contrib.* 6; *Prodr.* v. 26, *in part.* Cyanopis pubescens *and* villosa, *DC. Prodr.* v. 69. Conyza chinensis, *Lamk. Dict.* ii. 83, *not of Linn.* C. punctulata, *Wall. Cat.* 2995. Eupatorium menthæfolium, *Wall. Cat.* Isonema ovata, *Cass. in Dict. Sc. Nat.* xxiv. 25. Cynanthillium villosum *and* pubescens, *Blume Bijd.* 889 and 890. Centratherum chinense, *Less. in Linnæa*, 1829, 320.—Synanthera, *Wall. Cat.* 7136.

Eastern Peninsula, from Pegu to Malacca.—Distrib. Java, China, Philippines.

Annual; branches divaricate. *Leaves* 1–3 in., membranous. *Heads* $\frac{1}{3}$ in. diam.; peduncles slender; invol. bracts not numerous, glabrous or puberulous; receptacle pitted; corolla glabrous. *Achenes* $\frac{1}{8}$ in.; pappus $\frac{1}{8}$ in., hairs few, outer 0.—*Conyza patula*, Ait. Hort. Kew, v. 26, quoted under this by Lessing, is a very doubtful Chinese plant.

21. **V. saligna,** *DC. Prodr.* v. 33; much branched, glabrous or slightly scabrid, leaves sessile or shortly petioled elliptic-oblong or oblanceolate acuminate coarsely serrate, heads 6–12-flowered in terminal branched rounded corymbs, inner invol. bracts linear-oblong acute or acuminate scarious purplish outermost subulate, achenes strongly 10-ribbed glabrous, pappus reddish or white. *Clarke Comp. Ind.* 13. V. longicaulis, *DC. l. c.* Conyza saligna, *Wall. Cat.* 3061. Eupatorium longicaule, *Wall. Cat.* 3169.

Tropical Himalaya, from Nipal eastward, ascending to 4000 ft.; Assam, Khasia Mts., Chittagong, and Birma.

A coarse, leafy, almost shrubby, very variable herb. *Leaves* 3–6 by $\frac{1}{2}$–$2\frac{1}{2}$ in., rather rigid, often a little scabrid on both surfaces. *Heads* $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; peduncles slender; invol. bracts rigid, outermost very short, subulate, inner $\frac{1}{6}$ in. *Achenes* $\frac{1}{10}$ in., compressed; pappus $\frac{1}{4}$ in., outer hairs 0.

Var. ? *nilghirensis*; branches and inflorescence glandular-pubescent, pappus pale reddish-brown.—Nilgherry Mts., *Wight* (Kew Distrib. 1525), *Clarke.*—This much resembles *V. pectiniformis.*

22. **V. setigera,** *Arn. Pugill.* 27; tomentose or villous, branches grooved, leaves petioled ovate acuminate serrate, heads 6–10-flowered small in rounded terminal ebracteate corymbs, invol. bracts few linear shortly awned, achenes 4–5-angled nearly glabrous glandular, pappus yellowish. *DC. Prodr.* vii. 263; *Clarke Comp. Ind.* 18. V. neilgheryensis, *Thwaites Enum.* 160, *not of DC.*

Ceylon; Central Province, alt. 6–7000 ft., *Walker*, &c.

Erect, stout or slender, much branched, leafy. *Leaves* 2–3 in., narrowed into the petiole, glabrate above, black when dry. *Corymbs* lax, ebracteate; heads $\frac{1}{4}$ in. diam., obconic; invol. bracts few, puberulous; corolla glabrous. *Achenes* $\frac{1}{16}$ in., with a few short hairs; pappus $\frac{1}{6}$ in., outer very short or 0.

23. **V. Hookeriana,** *Arn. Pugill.* 28; hoary-puberulous, branches terete

or obscurely grooved, leaves petioled ovate acuminate serrate, heads small 20-flowered in lax open ebracteate corymbs, invol. bracts linear-oblong obtuse or mucronate pubescent, achenes 5-angled almost glabrous, pappus white. *DC. Prodr.* vii. 263; *Clarke Comp. Ind.* 19. V. conyzoides, *Thwaites Enum.* 160, *not of DC.*

CEYLON; Central Province, alt. 1–4000 ft., *Walker*, &c.

Very similar in habit to *V. setigera*, but only hoary, with looser corymbs, longer peduncles, smaller heads, with much shorter more obtuse invol. bracts and whiter pappus.

24. **V. Candolleana,** *Wt. & Arn. in Wight Cat.* 1509; branches terete villous, leaves subsessile elliptic or elliptic-lanceolate acute serrate, heads 15-flowered few small in a spreading villous corymb, invol. bracts few oblong pungent, achenes 4-angled glabrous, pappus white. *Clarke Comp. Ind.* 19. V. dindigulensis, *DC. Prodr.* vii. 263. V. conyzoides, *Wt. Ic.* t. 829, and vol. iii. part iv. p. 16 (*errata*), *not of DC.*

NILGHERRY and PULNEY MTS., *Wight.*

Apparently a low herb or shrub. *Leaves* 2–3 by ½–1 in., puberulous above, pubescent beneath. *Heads* ⅓ in. diam.; peduncles with a few setaceous bracts; invol. bracts puberulous, purple-tipped, outermost filiform; corolla glabrous. *Achenes* $\frac{1}{12}$ in.; pappus ¼ in., outer hairs subpersistent. —Collected by Wight alone, and the specimens are very poor, and, I suspect, all from the Pulneys, or other collectors would have found it in the Nilgherries.

25. **V. scariosa,** *Arn. Pugill.* 28; hispidly pubescent, leaves petioled elliptic acute serrate, heads 12–14-flowered small sessile terminal fascicled, invol. bracts linear-oblong awned glabrate outermost ovate acuminate, achenes glabrous, pappus reddish. *Thwaites Enum.* 161. Decaneuron? scariosum, *DC. Prodr.* vii. 264. Centratherum scariosum, *Clarke Comp. Ind.* 4.

CEYLON; Central Province, alt. 4–7000 ft., *Walker*, &c.

Branches grooved and ribbed, clothed with spreading and curled hairs. *Leaves* 1–5 by ½–2½ in., scabrid above, beneath hairy like the branches. *Heads* narrow, ¼ and ⅓ in. diam.; outer invol. bracts ¼–⅓; corolla glabrous. *Achenes* $\frac{1}{10}$ in.; pappus ¼ in., outer hairs few, short. —Thwaites' var. *β crassa* is only a more luxuriant state.

B. *Invol. bracts* all obtuse or apiculate, usually linear or oblong, rarely ovate and acute.

* Outer invol. bracts very large, broad, concealing the inner.

26. **V. calycina,** *Wall. in DC. Prodr.* v. 60; *Cat.* 2924; nearly glabrous, upper branches involucre and upper leaves beneath hoary-pubescent, leaves subsessile elliptic quite entire obtuse, heads subcorymbose, outer invol. bracts very large green elliptic or oblong obtuse inner linear acute.

BIRMA; Prome, *Wallich.*

Herbaceous, erect, black when dry. *Leaves* 2–4 by 1–2½ in., upper subobovate, rather unequal-sided, glabrous above, puberulous beneath. *Heads* 1 in. diam., shortly peduncled; corollas 40–50, puberulous. *Achenes* stellately pubescent and glandular; pappus ½ in. long; hairs reddish, shining; outer few, half as long as the inner.

** Outer invol. bracts longer than the inner, linear, with leafy tips; annual.

27. **V. anthelmintica,** *Willd.*; *DC. Prodr.* v. 61; tall, branched, glandular-pubescent, leaves petioled lanceolate or ovate-lanceolate coarsely serrate, heads subcorymbose, invol. bracts linear with broad purplish tips. *Ham. in Trans. Linn. Soc.* xiv. 217; *Wall. Cat.* 2920; *Wight Contrib.* 7; *Dalz. & Gibs. Bomb. Fl.* 313; *Kurz in Journ. As. Soc.* 1877, ii. 202; *Clarke Comp. Ind.* 10. Conyza anthelmintica, *Linn.* Serratula anthelmintica, *Roxb.*

Fl. Ind. iii. 405. Ascaricida indica, *Cass* in *Dict. Sc. Nat.* iii. *Suppl.* 38.—*Burm. Thes.* 210 t. 95. *Rheede Hort. Mal.* ii. t. 24.

Throughout INDIA; from Kashmir to Ceylon (nowhere ? indigenous) and Malacca, ascending to 5500 ft. in the Himalaya and Khasia Mts.—DISTRIB. Affghanistan.

A tall robust leafy annual. *Leaves* 3–8 in., rather membranous. *Heads* ½–¾ in. diam., about 40-fld. *Achenes* ⅕ in., 10-ribbed, pubescent; outer pappus rather longer, shining, reddish, flattened, deciduous; inner very short, rigid, paleaceous,

*** Outer invol. bracts much shorter than the inner.

† *Heads very small. Leaves not thickly clothed beneath with white woolly tomentum.*

28. **V. cinerascens,** *Schultz-Bip. in Schweinf. Ethiop.* 162; low, shrubby, much branched, clothed with ashy pubescence, leaves elongate spathulate tip rounded sessile with a very narrow base punctate, heads few small solitary on the divaricating branches of terminal cymes, invol. bracts linear subacute, achenes silky, pappus white. *Oliv. Fl. Trop. Afr.* iii. 275. V. spathulata, *Hochst. in Herb. Schweinf.* n. 2133.

The PUNJAB; at Peshawar, *Vicary, Talbot.* SALT RANGE, *Fleming.* WUZURISTAN, *Stewart.* SCIND, at Kurrache, *Stocks.*—DISTRIB. Beluchistan, Abyssinia.

Branches white, quite terete. *Leaves* ½–1½ in., green when dry, both surfaces alike. *Heads* ¼ in. diam.; peduncles with rarely minute bracts; invol. bracts linear, ⅛ in.; corolla glabrous. *Achenes* $\frac{1}{16}$ in., densely silky; pappus ⅙ in.; hairs all persistent, outer many short rigid.—The achene is incorrectly described in the *Flor. Trop. Africa.*

29. **V. elæagnifolia,** *DC. Prodr.* v. 22; climbing, branches petioles and inflorescence hoary, leaves petioled oblong linear-oblong or elliptic-lanceolate quite entire obtuse or acute glabrous and reticulate above loosely silky beneath, heads 3–5-flowered in narrow terminal short loose panicles all pedicelled, invol. bracts few small ovate obtuse, achenes compressed 5–8-ribbed glabrous, pappus white outer hairs few. *Clarke Comp. Ind.* 24; *Kurz For. Fl.* 11, 80. V. elliptica, *DC. in Wight Contrib.* 5; *Prodr.* v. 22. Conyza elæagnifolia, *Wall. Cat.* 3041.

PEGU; Maclelland. TENASSERIM, *Wallich, Griffith,* &c.—DISTRIB. Siam.

Branches long, woody, finely grooved. *Leaves* 1–3 by ⅓–1 in., pale and almost silky beneath; petiole slender. *Heads* ¼ in. diam., about 3 at the end of the rigid divaricating branches of the panicle; invol.-bracts $\frac{1}{10}$ in.; corolla glabrous. *Achenes* $\frac{1}{12}$ in.; pappus ⅕ in., persistent.

30. **V. nemoralis,** *Thw. Enum.* 160; herbaceous, branches and heads puberulous, leaves petioled elliptic- or linear-lanceolate acuminate distantly serrate glabrous on both surfaces nerves obscure, invol. bracts linear-oblong obtuse, achenes hairy, pappus white. *Clarke Comp. Ind.* 11.

CEYLON; Saffragam, Galagama, &c. *Walker,* &c.

Apparently a slender herb. *Leaves* 2–4 by ¼–1 in., young slightly pubescent beneath. *Heads* sometimes corymbose, ¼–½ in. diam.; outermost invol. bracts short, obtuse. Corolla glabrous. *Achenes* obscurely 10-ribbed; pappus ⅓ in., outer bristles very short.

†† *Heads large or small. Leaves thickly clothed beneath with dense white* or *buff woolly tomentum. Shrubs.*

31. **V. salviæfolia,** *Wight Ic.* t. 1079; branches woody, inflorescence and leaves beneath clothed densely with white wool, leaves crowded at the ends of the branches sessile linear-lanceolate obtuse crenulate rugulose above, heads 10–14-flowered in open corymbs, invol. bracts short oblong acute, achenes com-

pressed obscurely 3–4-angled glabrous, pappus pale reddish. *Clarke Comp. Ind.* 20. V. Arnottiana, *Thoms. mss. ex Clarke.*

TRAVANCORE, at Courtallam, *Wight.*

Branches very thick. *Leaves* 4–6 by $\frac{1}{2}$–$\frac{3}{4}$ in., thick, above almost tubercled by the short close-set high wrinkles between the numerous nerves. *Heads* $\frac{1}{4}$ in. diam., subsessile; peduncles with few small linear axillary bracts; invol. bracts $\frac{1}{6}$ in.; corolla glabrous. *Achenes* $\frac{1}{8}$ in.; pappus as long; outer hairs very numerous, short, flat, persistent, inner caducous.

32. **V. Wightiana,** *Arn. Pugill.* 27; shrubby, branches leaves beneath and corymbs clothed with dense buff wool, leaves shortly petioled elliptic or elliptic-lanceolate obtuse or acute obscurely toothed woolly but finally glabrate above, heads 30–40-flowered in terminal open corymbs, invol. bracts short oblong acute, achenes 4–5-ribbed glabrous, pappus dirty white. *DC. Prodr.* vii. 263; *Thwaites Enum.* 160, *excl. var.* β; *Clarke Comp. Ind.* 19.

CEYLON; central province, alt. 5–8000 ft., *Macrae,* &c.

Branches terete, stout or slender, leafy. *Leaves* 2–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in., coriaceous; petiole sometime $\frac{3}{4}$ in. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; peduncles stout, with a few narrow bracts; invol. bracts $\frac{1}{6}$ in., woolly; corolla laxly hairy. *Achenes* $\frac{1}{12}$ in.; pappus $\frac{1}{6}$ in., outer hairs very short flattened.

33. **V. indica,** *Clarke Comp. Ind.* 16; branches leaves beneath and inflorescence clothed with dense soft whitish tomentum, leaves subsessile elliptic or almost orbicular acute serrate-toothed coriaceous, heads numerous in broad terminal corymbs 6–10-flowered, invol. scales broad oblong mucronate, achenes glabrous, pappus yellowish. Conyza indica, *Wall. Cat.* 3042. Decaneuron dendigulense, *DC. in Wight Contrib.* 7; *Prodr.* v. 67. Lysistemma dendigulense, *Steetz in Peters Mosamb. Bot.* 341.

WESTERN PENINSULA; on the Ghats, from the Concan to Travancore.

An undershrub, 2–3 ft., erect; branches terete. *Leaves* 3–6 by $1\frac{1}{2}$–5 in., rigid, scaberulous above; nerves many, much raised beneath, petiole rarely 1 in. *Heads* $\frac{1}{4}$ in. diam., crowded at the end of the stout branches; inner invol. bracts $\frac{1}{8}$ in., tomentose, closely imbricate, outermost minute ovate; corolla glabrous. *Achenes* $\frac{1}{10}$ in.; pappus $\frac{1}{4}$ in.; outer hairs 0.

34. **V. zeylanica,** *Less. in Linnæa,* 1829, 344; branches leaves beneath and corymbs ashy tomentose or woolly, leaves shortly petioled ovate with a lyrate usually auricled base acute coarsely crenate, heads 4–8-flowered small fascicled in large terminal corymbs, invol. bracts very short ovate acute, achenes 5-ribbed puberulous, pappus pale reddish. *DC. in Wight Contrib.* 5; *Prodr.* v. 26; *Clarke Comp. Ind.* 20. Eupatorium zeylanicum, *Linn.*—Cacalia, *Burm. Thes. Zeyl.* 52 t. 21.

CEYLON; hilly parts of the island ascending to 3000 ft.

Branches slender, grooved and ribbed. *Leaves* 1–$2\frac{1}{2}$ by $\frac{1}{2}$–1 in., coriaceous, puberulous above, densely woolly and reticulate beneath, basal auricles horizontal. *Heads* $\frac{1}{4}$ in. diam.; peduncles with few small axillary bracts; invol. bracts few, woolly, $\frac{1}{10}$ in. long; corolla glabrous. *Achenes* $\frac{1}{18}$ in. long; pappus $\frac{1}{6}$ in.; outer hairs few, very short.

††† *Heads usually large. Leaves not clothed with white wool beneath.*

35. **V. extensa,** *DC. Prodr.* v. 33; branches and inflorescence pubescent, leaves petioled lanceolate acuminate sharply serrate glabrous or scaberulous above pubescent or glabrate beneath, heads in loose terminal corymbs 8–10-flowered, invol. bracts few linear-oblong concave obtuse coriaceous, outermost very short obtuse, achenes pubescent, pappus reddish. *Clarke Comp. Ind.* 15.

Conyza extensa, *Wall. Cat.* 3016. Gymnanthemum extensum, *Steetz in Peters Mosamb. Bot.* 337.

CENTRAL and EASTERN TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, J. D. H.; Bhotan, *Griffith.*

Erect, 6–8 ft., branched. *Leaves* 6–10 by 2½–3 in., narrowed into a short or long petiole, membranous. *Heads* ½ in. diam., longer than broad; peduncles very slender; invol. scales not numerous, hard, closely imbricate, puberulous, inner ¼ in.; corolla pubescent. *Achenes* ⅙ in.; pappus ⅓ in., outer hairs few or 0.—Clarke likens this to *V. blanda*, and suggests its being a variety of that plant, but the sharply serrate long leaves are very different.

36. **V. pectiniformis,** *DC. in Wight Contrib.* 2; *Prodr.* v. 31; shrubby, branches glabrate pubescent scabrid villous or glandular, leaves petioled elliptic-lanceolate acuminate serrate glabrous or scabrid above puberulous pubescent or tomentose beneath usually many-nerved, heads 10–25-flowered in short broad terminal corymbs, inner invol. bracts oblong obtuse or apiculate, outer small acuminate, achenes glabrous, pappus dirty white or reddish. *Arn. Pugill.* 27; *Wight Ic.* t. 1077. V. puncticulata, *DC. Prodr.* vii. 264. Lysistemma pectiniforme, *Steetz in Peters Mosamb. Bot.* 343.

NILGHERRY MTS., alt. 8000 ft. CEYLON; central province, alt. 6–7000 ft., *Walker*, &c.

Branches usually stout, ribbed and grooved. *Leaves* often close-set, 3–6 by 1–2½ in., rigid, narrowed into the petiole, nerves 6–12 pair. *Heads* ½ in. diam, peduncles short; invol. bracts hard, concave, usually with rounded coloured tips, outer gradually smaller, often subulate and recurved; receptacle fimbriate; corolla glabrous. *Achenes* ⅛ in.; pappus ⅓ in long, outer hairs short, sometimes numerous, most red in Ceylon specimens.

37. **V. arborea,** *Ham. in Trans. Linn. Soc.* xiv. 218; a tree, branches and corymbs pubescent tomentose or woolly, leaves large petioled elliptic or elliptic-ovate acuminate quite entire glabrous or beneath pubescent, base acute rounded or cordate, heads 1–6-flowered small in large leafless terminal panicles, invol. bracts very small oblong obtuse, achenes compressed or 3–4-gonous obscurely 8–10-ribbed puberulous, pappus white or yellowish hairs persistent all equal. *DC. Prodr.* v. 22; *Kurz For. Fl.* ii. 80. V. javanica, *DC. l. c.*; *Bedd. For. Man.* 125. V. Blumeana *and* celebica, *DC. l. c.* 22. Eupatorium celebicum *and* javanicum, *Blume Bijd.* 903. Conyza acuminata *and* arborea, *Wall. Cat.* 3034 A., 3074. ? Gymnanthemum acuminatum, *Steetz. in Peters Mosamb. Bot.* 336.

ASSAM, the KHASIA MTS., SILHET, CACHAR, BIRMA, TENASSERIM, MALACCA, and SINGAPORE. WESTERN PENINSULA on the Ghats, from the Concan, southwards. CEYLON, ascending to 5000 ft.—DISTRIB. Java, Borneo, Philippines.

A large shrub or small tree. *Leaves* 5–8 by 2–3 in., coriaceous, quite glabrous in northern specimens, more or less pubescent in Malayan; petiole ½–1 in. *Heads* ⅓ in. diam.; involucre small; bracts few, $\frac{1}{10}$ in long, tomentose; corolla glabrous. *Achenes* $\frac{1}{12}$ in., pale; pappus ¼ in., hairs few, all equal and in one row.—A Philippine Island's var. has branches inflorescence and leaves beneath densely clotted with white or buff velvety pubescence. The Malaccan and Silhet forms have the leaves usually quite glabrous, the Tenasserim ones pubescent, the Ceylon densely pubescent.

VAR. ? *Wightiana*; branches leaves beneath and inflorescence very densely woolly, petioles usually shorter and stout, heads often 1-fld. V. monosis, *DC. in Wight Contrib.* 5; *Ic.* t. 1085; *Clarke Comp. Ind.* 24; *Bedd. Fl. Sylv.* t. 225. Conyza Wightiana, *Wall. Cat.* 3028.—Western Peninsula, on the Ghats, from the Concan southwards.—I can scarcely doubt this being a form of *V. arborea*, with which it perfectly agrees in the form of the leaves, heads, achenes, and pappus, but the petioles are usually very short and thick, as in *V. solanifolia*, sometimes however long and slender as figured by Wight.

38. **V. solanifolia,** *Benth. in Lond. Journ. Bot.* i. 486; *Kew Journ.* iv. 232; *Fl. Hongk.* 169; subarboreous, branches leaves beneath and panicles densely softly woolly, leaves petioled ovate-oblong or elliptic obtuse or acute entire or sinuate-toothed base rounded or cordate, heads 3-5-flowered in open large terminal panicles, invol. bracts few small ovate obtuse woolly, achenes 8–10-ribbed glabrous, pappus yellowish persistent with short outer bristles. V. Kurzii, *Clarke Comp. Ind.* 24; *Kurz For. Fl.* ii. 80.

MARTABAN and PEGU; in dry forests, *Kurz*.—DISTRIB. China.

A large weak shrub or small tree, which I cannot distinguish from the densely woolly form of *V. arborea*, except by the leaves being usually tomentose above with a shorter very stout petiole, and the presence of the outer pappus bristles.

39. **V. volkameriæfolia,** *DC. Prodr.* v. 32; a tree, branchlets and panicles pubescent or tomentose, leaves large petioled obovate or obovate-oblong or lanceolate acute or obtuse glabrous above pubescent on the nerves beneath entire or subserrate, heads 3-10 flowered in large terminal leafless panicles, invol. bracts puberulous few linear-oblong obtuse, achenes 10-ribbed nearly glabrous, pappus whitish persistent. *Kurz in Journ. As. Soc.* 1877, ii. 202. V. punduana, *DC. Prodr.* v. 32. V. acuminata, *DC. l. c. excl. syn.*; *Clarke Comp. Ind.* 22; *Kurz For. Fl.* ii. 79. V. punduana, vulgaris *and* volkameriæfolia, *Steetz in Peters Mosamb. Bot.* 346. V. cuspidata, *Buek in Index Candoll.* ii. 5. Conyza volkameriæfolia *and* punduana, *Wall. Cat.* 3001, 3035.

SIKKIM HIMALAYA, KHASIA and JAINTEA MTS.; alt. 2–5000 ft. MISHMI HILLS, *Griffith*. BIRMA, *Kurz*.

A small tree; branches robust, terete. *Leaves* 5-12 by 1½-4 in., rather thin, narrowed into very short petioles. *Heads* very numerous, ½-¾ in diam.; peduncles short or long, stout, with small bracts at the base; invol. bracts ¼ in.; corolla glabrous. *Achenes* ⅛ in., with a few scattered short hairs; pappus ⅓ in., very persistent, outer hairs few short.

40. **V. travancorica,** *Hook. f.*; a tree, branchlets and inflorescence hoary-pubescent, leaves shortly petioled obovate obtuse sinuate towards the tip, glabrous on both surfaces, heads 5–6-flowered in terminal leafless panicles, invol. bracts few short oblong obtuse silky, achenes 10-ribbed glandular, pappus white deciduous. V. volkameriæfolia, *Beddome, Fl. Sylv.* t. 225 (*not of DC.*).

TRAVANCORE, *Beddome*.

Closely allied to *V. volkameriæfolia*, but differing from it and from *V. arborea* in the silky invol. bracts, and very deciduous quite white pappus.—I have seen but one specimen; it exactly accords with Beddome's figure.

41. **V. talaumifolia,** *Hook. f. & T. Herb. Ind. Or.*; a tree, branches very thick, leaves beneath and inflorescence puberulous or nearly glabrous, leaves very large shortly petioled obovate or oblanceolate subacute entire or sinuate-toothed, heads 8–20-flowered in very large irregularly branched terminal panicles, invol. bracts ovate obtuse, achenes deeply 10-ribbed glabrous, pappus red, outer hairs slender. *Clarke Comp. Ind.* 25.

SIKKIM HIMALAYA; alt. 1-4000 ft., *J. D. H. & T. T.* BHOTAN, *Clarke*. ASSAM, *Masters*. MISHMI HILLS, *Griffith*.

Much the largest Indian species. *Branches* as thick as the little finger. *Leaves* 16 by 6 in. and under, very coriaceous, glabrous, shining and reticulated on both surfaces, or pubescent on the nerves beneath; petiole ¼ in. *Heads* ⅜ in. diam., sessile on the long dichotomous divaricating branches of the panicle; invol. bracts ⅛ in., glabrate; corolla glabrous. *Achenes* ⅛ in.; pappus nearly ½ in.

42. **V. Parishii,** *Hook. f.*; branches robust and inflorescence finely tomentose, leaves large shortly petioled oblanceolate subacute obscurely toothed reticulate minutely pubescent above more so beneath, midrib closely pubescent

on both surfaces, heads corymbose in a large panicle, invol. bracts oblong herbaceous obtuse or acute, achenes glandular, pappus white.

MOULMEIN; hills on the Attran, *Parish.*

A good deal resembling *V. Lobbii*, but the leaves are much more pubescent beneath, the heads form a large terminal branched panicle, nearly a foot long; the invol. bracts are herbaceous and very different in shape, and the achenes are not tomentose.

43. **V. scandens,** *DC. Prodr.* v. 32; climbing, branches slender and inflorescence glabrous or pubescent, leaves petioled ovate elliptic or lanceolate acuminate quite entire glabrous or pubescent beneath, heads 5–10-flowered in long leafy terminal panicles all pedicelled, invol. bracts ovate or linear-lanceolate acute or obtuse, achenes compressed glabrous deeply 10-ribbed, pappus red outer hairs few short slender. *Clarke Comp. Ind.* 26; *Kurz For. Fl.* ii. 81. Conyza scandens, *Wall. Cat.* 3060. V. vagans, *DC. l. c.*; *Clarke l. c.* Gymnanthemum scandens *and* vagans, *Steetz in Peter's Mosamb. Bot.* 338.

SIKKIM HIMALAYA and the KHASIA MTS.; ascending to 4000 ft. ASSAM, SILHET, and BIRMA.

A rambling climber, branches woody. *Leaves* $2\frac{1}{2}$–4 by 1–$2\frac{1}{2}$ in., rather thin; petiole slender. *Heads* $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; pedicels slender; invol. bracts very variable in breadth, puberulous, inner $\frac{1}{3}$ in. long; corolla glabrous. *Achenes* $\frac{1}{8}$–$\frac{1}{5}$ in. long; pappus between $\frac{1}{3}$–$\frac{1}{4}$ in. long.—I cannot distinguish between *V. scandens* and *V. vagans*, which in their extreme forms differ, the former in the broader blunter invol. bracts, and I think longer achenes, but I find achenes of $\frac{1}{8}$ and $\frac{1}{5}$ in. in the same specimen.

44. **V. blanda,** *DC. Prodr.* v. 32; a rambling shrub, slender branches and leaves glabrous, panicles puberulous, leaves petioled elliptic acuminate at both ends quite entire, heads 10–25-flowered in elongate branched terminal panicles, invol. bracts linear-oblong acute puberulous, receptacle glabrous, achenes pubescent 10-ribbed, pappus red outer hairs few. *Clarke Comp. Ind.* 25; *Kurz in Journ. As. Soc.* 1877, ii. 202. *excl. syn.*; *For. Fl.* ii. 81. V. blandula, *Clarke l. c.* 26. Conyza blanda, *Wall. Cat.* 3033.

MARTABAN and TENASSERIM; on the Saluen river, *Wallich.* PEGU, *Scott.*

Very similar to *V. scandens*, but with pubescent achenes.

45. **V. Andersoni,** *Clarke Comp. Ind.* 27; scandent, branches leaves beneath and inflorescence pubescent or tomentose, leaves petioled ovate acute or acuminate quite entire finely reticulated, heads 5–15-flowered in axillary and terminal loose panicles, invol. bracts small ovate obtuse, receptacle hairy, achenes deeply 10-ribbed flattened puberulous, pappus red outer hairs 0. V. Cumingiana, *Benth. Fl. Hongk.* 170 (*not of Kew Journ. Bot.* iv. 333).

UPPER ASSAM; Naga hills, *Masters.* BIRMA, *Griffith.* TENASSERIM, *Helfer.*—DISTRIB. Hongkong.

Very similar to large-leaved states of *V. scandens* with obtuse invol. bracts, but the leaves are thinly leathery, the nerves beautifully reticulated, the achenes puberulous, and the receptacle covered with deciduous fulvous hairs. *Invol. bracts* $\frac{1}{10}$ in., narrowly oblong, very obtuse, nearly glabrous. *Achenes* (in Hongkong specimen) $\frac{1}{6}$ in. long; pappus upwards of $\frac{1}{3}$ in.—Bentham is mistaken in referring the Hongkong plant to his *V. Cumingiana* of the Philippines, which has a naked receptacle and far more numerous flowers in a head; as is Kurz (*Journ. As. Soc.* 1877, ii. 202) in referring *V. Andersoni* to *blanda.*

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

? V. (EUPATORIUM PECTINATUM, *Wall. Cat.* 3172.) from the Nilgherry Mts.; there is no specimen of this in the Wallichian Herbarium.

V. (DECANEURON LILACINUM, *Dalz. & Gibs. Bomb. Fl.* 314); there is no specimen of this in Dalzell's Herbarium, and I fail to identify it by the description.

6. ELEPHANTOPUS, *Linn.*

Rigid herbs. *Leaves* alternate. *Heads* homogamous of 2–5 flowers collected into a head-like cluster. *Involucre* compressed; bracts about 8, dry, stiff, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed and cleft on one side and with the lobes spreading somewhat palmately. *Anther-bases* obtuse. *Style-arms* subulate. *Achenes* truncate, 10-ribbed; pappus bristles rigid, shining, slender and dilated below or chaff-like.—DISTRIB. Species 10–12, chiefly tropical American, with one cosmopolitan.

1. **E. scaber,** *Linn.*; *DC. Prodr.* v. 86; dichotomously branched, 1–2 ft. high, strigose scabrid and villous, radical leaves obovate-oblong crenate cauline few sessile, heads clusters of 1 in. diam. surrounded by cordate leafy bracts, invol. bracts pungent, achenes hairy, pappus of 4–5 rigid bristles dilated at the base. *Wall. Cat.* 2979; *Wight Ic.* t. 1086; *Roxb. Fl. Ind.* iii. 445; *Don Prodr.* 169; *Dalz. & Gibs. Bomb. Fl.* 122; *Clarke Comp. Ind.* 28.—*Rheede Hort. Mal.* x. t. 7.

Throughout INDIA, from the Punjab ? to CEYLON and SINGAPORE.—DISTRIB. Tropical Asia, Australia and America.

The embryo not unfrequently germinates in the head.

TRIBE II. EUPATORIEÆ.

7. ADENOSTEMMA, *Forst.*

Glabrous or glandular-pubescent herbs. *Leaves* mostly opposite. *Heads* corymbose, homogamous. *Involucre* campanulate; bracts many, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular; tube short; limb campanulate, 5-toothed. *Anthers* truncate with a glandular tip, base obtuse. *Style-arms* elongate, dilated above. *Achenes* obtuse, 5-ribbed, glandular; pappus hairs 3–5, short, rigid, often clavate, inserted in a short ring.—DISTRIB. Species 5 or 6 American, 1 cosmopolitan.

1. **A. viscosum,** *Forst*; *DC. Prodr.* v. iii.; *Clarke Comp. Ind.* 28.

Throughout INDIA; ascending to 5000 ft. on the Himalaya and other ranges, and to 6000 in Ceylon.—DISTRIB. All tropical countries.

An erect rarely decumbent annual, glabrous pubescent or viscidly pubescent, slender or robust. *Leaves* sessile or petioled, opposite or the upper alternate, from linear to broadly ovate, serrate. *Heads* few or many, in lax or dense panicles or corymbs; invol. bracts oblong, obtuse or acute, glabrous glandular or scabrid.—Of this most variable plant there is but one species. Clarke distinguishes the following marked Indian forms.

VAR. 1. *typica*; leaves oblong-lanceolate subacute crenate glabrescent, achenes sparingly warted. *DC. l. c.* A. leiocarpum, *DC. in Wight. Contrib.* 9; *Prodr. l. c.* A. Roylei, *DC. l. c.* 112. A. rivale, *Dalz. in Hook. Kew Journ.* iii. 231; *Dalz. & Gibs. Bomb. Fl.* 122. A. angustifolium, *Arn. Pugill.* 29; *DC. l. c.* vii. 266. Lavenia alba, *Wall. Cat.* 3220. Ageratum aquaticum, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 415.

VAR. 2. *elata*; leaves broadly ovate or cordate nearly glabrous, achenes and invol. bracts as in Var. 1. A. elatum, *DC. l. c.* 112; ? *Don Prodr.* 181. A. aquaticum, *Don l. c.* A. microcephalum, *DC. l. c.* Lavenia erecta *and* carnosa, *Wall. Cat.* 3218 *in part*, 3219. Ageratum strictum, *Bot. Mag.* t. 2410.

VAR. 3. *latifolia*; leaves broadly ovate or cordate nearly glabrous sometimes very large, achenes densely warted. A. latifolium, *DC. l. c.* 112; *Don Prodr.* 181. Lavenia erecta, *Wall. Cat.* 3218 C.—one of the best marked varieties.

VAR. 4. *parviflora*; leaves elliptic glabrous membranous, branches of panicle slender, achenes small densely warted. A. macrophyllum *and* parviflorum, *DC. l. c.* iii. 113. Lavenia macrophylla *and* parviflora, *Blume Bijd.* 905, 906. Lavenia viscida, *Wall. Cat.* 3222 A.

VAR. 5. *fastigiata* (*not of Clarke Comp. Ind.* 29), leaves ovate-lanceolate glabrous, panicles fastigiate, achenes scabrid and warted. A. fastigiatum, *DC. l. c.* 111. Lavenia fastigiata, *Blume l. c.* 905.

VAR. 6. *rugosa*; leaves ovate coriaceous rugose, achenes densely warted. A. rugosum, *DC. in Wight Contrib.* 8; *Prodr. l. c.* 112; *Deless. Ic. Sel.* iv. t. 10. A. latifolium, *Wt. Ic.* t. 1087. A. fastigiatum, *Schultz-Bip. in Herb. Hohenack.* n. 612 (not of *DC.*). Lavenia rugosa, *Wight in Wall. Cat.* 3221.—Nilgherry, &c. Mts. only.

VAR. 7. *reticulata*; leaves ovate sometimes a span broad often reticulate, achenes smooth or sparsely warted often elongate. A. reticulatum, *DC. in Wight Contrib.* 8; *Prodr.* v. 113; *Wt. Ic.* t. 1088. A. viscosum, madurense *and* leiocarpum, *DC. in Wight Contrib.* 9; *Prodr.* v. 113. A. erectum, *DC. l. c.* Verbesina Lavenia, *Linn. Fl. Zeyl.* 145.—*Burm. Thes. Zeyl.* t. 42.—South India and Ceylon.

8. AGERATUM, *Linn.*

Erect herbs or shrubs. *Leaves* opposite or the upper alternate. *Heads* corymbose or panicled, homogamous. *Involucre* campanulate; bracts 2–3-seriate, linear, subequal; receptacle flat or nearly so, naked or with caducous scales. *Corollas* all tubular, equal, regular, limb 5-cleft. *Anthers* appendaged, base obtuse. *Style-arms* elongate, obtuse. *Achenes* 5-angled; pappus of 5 short free or connate scales, or of 10–20 narrow unequal scales.—DISTRIB. Species about 16, probably all American, but now distributed throughout the tropics.

1. **A. conyzoides,** *Linn.*; *DC. Prodr.* v. 108; annual, 1–2 ft., hispidly hairy, leaves petioled ovate crenate, heads small in dense terminal corymbs, bracts striate acute, ray-fl. many pale blue or white, achenes black, pappus scales 5 awned often serrate below. *Clarke Comp. Ind.* 30; *Wall. Cat.* 3176. A. cordifolium, *Roxb. Fl. Ind.* iii. 415; *Wall. Cat.* 3177.

Throughout INDIA; ascending the Himalayas to 5000 ft.—DISTRIB. All hot countries.

9. EUPATORIUM, *L.*

Herbs shrubs or undershrubs. *Leaves* opposite or alternate. *Heads* corymbose, homogamous. *Involucre* long or short; bracts few- or many-seriate, subequal or outer shorter; receptacle naked. *Corollas* all equal, regular, tubular; tube slender; limb 5-lobed or toothed. *Anthers* appendaged, base obtuse. *Style-arms* long, obtuse. *Achenes* truncate, 5-angled or -ribbed; pappus-hairs 1-seriate, many, rigid, scabrid.—DISTRIB. About 400 species, chiefly American.

1. **E. Reevesii,** *Wall. Cat.* 3168; *DC. Prodr.* v. 179; hoary-pubescent, leaves simple ovate or lanceolate acuminate entire or coarsely serrate, corymbs very many rounded, heads ¼ in. long, invol. bracts very obtuse. *Clarke Comp. Ind.* 32. E. longicaule, *Wall.*; *Clarke l. c.* 32, *not of DC.* E. squamosum, *Don Prodr.* 170. Conyza longicaulis, *Wall. Cat.* 3073. Mikania clematidea, *Wall. in DC. l. c.* 191; *Cat.* 3173.

SUBTROPICAL HIMALAYA; from Simla to Bhotan alt. 2–6000 ft. exclusive of Sikkim.—DISTRIB. China, Japan.

Tall, erect or scandent, slender, much branched above. *Leaves* 1–2 in., puberulous above, 3-pli-nerved; petiole short. *Heads* pale, fastigiate; invol. bracts 5–8, obtuse, hoary; flowers 5–8.—This is usually called *E. longicaule*, of De Candolle, whose description does not agree with my Indian specimens and is probably made up of more than one Wallichian plant.

2. **E. cannabinum,** *Linn.*; *DC. Prodr.* v. 180; pubescent or puberulous, leaves simple or trisect lanceolate coarsely serrate, corymbs many rounded, heads ½ in. long, inner invol. bracts subacute. *Clarke Comp. Ind.* 34. E. Wallichii *and* heterophyllum, *DC. l. c.* 179, 180. E. punduanum, *Wall. in DC. Prodr. l. c.* 179; *Cat.* 3170; *Clarke l. c.* 33. E. nodiflorum, *Wall. Cat.* 3166;

DC. l. c. 179; *Clarke l. c.* 33. E. Lambertianum *and* viscosum, *Wall. Cat.* 3287, 3288. E. dicline, *Edgew. in Trans. Linn. Soc.* xx. 63. E. Simonsii, *Clarke l. c.* 32.

TEMPERATE HIMALAYA; abundant from 3–11,000 ft. KHASIA MTS.; alt. 3–6000 ft. BIRMA.—DISTRIB. Europe and Temp. Asia.

A taller usually coarser plant than *E. longicaule*, with larger heads.—To this species many described ones are referable. Of *E. Lambertianum*, there is only one specimen in Wallich's Herbarium, but there are many in Mr. Clarke's, all from the Khasia; it differs in the more rigid strongly triply-nerved leaves, that are also strongly reticulated beneath, but passes into the commoner Khasian form of *E. cannabinum.*

EXCLUDED AND SUPPRESSED SPECIES.

E. AYAPANA, *Vent. Hort. Malm.* t. 3; *DC. Prodr.* v. 169. Cyanopis? erigeroides, *DC. in Wight Contrib.* 7 (*not. V. erigeroides, DC.*) is an American plant, introduced into the Calcutta and other gardens.

E. BIRMANICUM, *DC. Prodr.* v. 179; *Clarke Comp. Ind.* 34, is a Japan plant, not different from *E. cannabinum.*

E. FINLAYSONIANUM, *Wall. Cat.* 7133; *DC. Prodr.* v. 179; *Clarke Comp. Ind.* 34, from Finlayson's Herbarium, is *E. cannabinum.*

E. LONGICAULE, *DC. Prodr.* v. 178; it is impossible to say what this is. De Candolle's description does not agree with that of the plant cited under it (*Conyza longicaulis,* Wall.; *Mikania? longicaulis,* Wall.).

E. ODORATUM, *Linn.*; *DC. Prodr.* v. 143; *Clarke Comp. Ind.* 30, is a West Indian species, cultivated, but very rarely, in India.

E. POLYANTHUM, *Wall. Cat.* 3171; from Herb. Wight. There is no specimen of this in the Wallichian Herbarium, and it is impossible to say what it may have been.

E. SUAVEOLENS, *Wall. Cat.* 3290, from the banks of the Irawaddy at Seguen; there is no specimen of this in the Wallichian Herbarium.

10. MIKANIA, *Willd.*

Shrubs, or erect or twining herbs. *Leaves* opposite. *Heads* small, spiked racemed or panicled, homogamous, usually 4-flowered. *Involucre* oblong; bracts 4, narrow, with often a smaller outer one; receptacle narrow, naked. *Corollas* all equal, regular, tubular, tube slender; limb campanulate, 5-fid. *Anthers* appendiculate, base obtuse. *Style-arms* long, acute. *Achenes* truncate, 5-angled; pappus-hairs numerous, 1–2-seriate, scabrid, often connate at the base.—DISTRIB. About 60 species, all American, one of them cosmopolitan.

1. **M. scandens,** *Willd.*; *DC. Prodr.* v. 199; climbing, glabrous or puberulous, leaves long-petioled ovate acute or acuminate base rounded cordate or truncate crenate or angled, sometimes villous beneath, heads 4-flowered corymbose terminating lateral branches, achenes glabrous glandular, pappus reddish. *Clarke Comp. Ind.* 34. M. volubilis *and* M. chenopodifolia, *Willd.*; *DC. l. c.* 199 and 201. Eupatorium scandens, *Linn.*; *Jacq. Ic.* t. 169.

EASTERN ASSAM, *Clarke*; Duphla hills, *Nuttall.* BIRMA and MALAY PENINSULA from Tenasserim to Singapore.—DISTRIB. Siam, Malayan and Philippine Islands.

TRIBE III.—ASTEROIDEÆ.

11. SOLIDAGO, *Linn.*

Perennial herbs. *Leaves* alternate. *Heads* small, often in scorpioid cymes, heterogamous, rayed, yellow; ray-fl. few, 1-seriate, ♀, ligulate; disk-fl. tubular, 5-fid. *Involucre* oblong or campanulate; bracts many-seriate, coriaceous; receptacle small, usually pitted. *Anther-bases* obtuse. *Style-arms* of ☿

flattened, tips lanceolate. *Achenes* subterete or angled, 8–12-ribbed; pappus-hairs 1–2-seriate, slender, scabrid.—DISTRIB. Species about 80, chiefly N. American, one of them cosmopolitan in the N. temp. regions.

1. **S. Virga-aurea,** *Linn.*; *DC. Prodr.* v. 338; glabrous or pubescent, stems erect stout subsimple 6–24 in., lower leaves petioled ovate or oblong subserrate, upper smaller narrower entire, heads 1–4 on short axillary peduncles collected in a long leafy panicle, invol. bracts narrow acute, ray-fl. about 8, achenes glabrous or puberulous. *Clarke Comp. Ind.* 35.

TEMPERATE HIMALAYA; from Kashmir eastwards, alt. 5–9000 ft. KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Europe, Temp. Asia and America, Hongkong.

VAR. 1. *leiocarpa*, Benth. Fl. Hongk. 179; var. *glabriuscula*, Clarke l. c., glabrous or nearly so, achenes glabrous.—Kashmir to Nepal.—Amphiraphis leiocarpa, *Benth. in Hook. Lond. Journ. Bot.* i. 488.

VAR. 2. *pubescens*, Clarke l. c.; pubescent, achenes puberulous, at least when young. S. pubescens, *Wall. Cat.* 3226. S. nepalensis, *Don Prodr.* 177. Amphiraphis pubescens, *DC. Prodr.* v. 343.—Nipal to Khasia Mts.

12. DICHROCEPHALA, *DC.*

Annuals. *Leaves* alternate, toothed, lyrate or pinnatifid. *Heads* very small, panicled, heterogamous, globose or hemispheric, not rayed; outer fl. ∞-seriate, ♀, fertile, slender, rigid, 2–3-toothed or cleft; disk-fl. ☿, fertile, narrow, 4–5-toothed. *Anther-bases* truncate. *Style-arms* of ☿ short, flattened, tips lanceolate. *Achenes* compressed; pappus 0, or in ☿ of 2 minute bristles.—DISTRIB. Species 5, Asiatic and African.

* *Receptacle much elevated.*

1. **D. latifolia,** *DC. in Wight Contrib.* 11; *Prodr.* v. 372; annual, erect or spreading, glabrous pubescent or villous, leaves petioled ovate or lanceolate entire pinnatifid or lyrate, terminal lobe broadly ovate coarsely toothed, heads $\frac{1}{8}$ in. diam. globose, ray-fl. filiform curved obscurely toothed. *Dalz. & Gibs. Bomb. Fl.* 124; *Wight Ic.* t. 1096; *Clarke Comp. Ind.* 36. D. gracilis *and* sonchifolia, *DC. l. c.* 371, 372. D. nilagirensis, *Schultz-Bip. in Pl. Hohenack.* n. 1035. Cotula sinapifolia, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 437; *Wall. Cat.* 3237 *excl. D.* C. bicolor, *Roth Cat. Bot.* ii. 116. C. latifolia, *Pers. Syn.* ii. 464. Grangea latifolia, *Lamk. Ill.* t. 699. Hippia bicolor, *Smith in Rees Cyclop.* xviii. Ethulia integrifolia, *Don Prodr.* 182.

TROPICAL and SUBTROPICAL HIMALAYA; from Simla, alt. 9000 ft. to Sikkim, ascending to 8000 ft. KHASIA MTS., CACHAR, BURMA and the MALAY PENINSULA. WESTERN PENINSULA; on the Ghats from Bombay southwards.—DISTRIB. Tropical and subtropical Asia and Africa.

A weed 12–24 in. high. *Leaves* very variable. *Heads* on slender divaricating peduncles, yellow or purplish. *Corolla* of the ♀ very slender, sometimes green and persistent. *Achenes* $\frac{1}{24}$ in., smooth.

2. **D. chrysanthemifolia,** *DC. in Wight Contrib.* 11; *Prodr.* v. 372; erect, stiff, pubescent or hispid, branches divaricate, leaves oblong or obovate coarsely serrate or pinnatifid, heads long-peduncled $\frac{1}{4}$–$\frac{1}{3}$ in. diam. globose or oblong, ray-fl. short 4-fid. *Wight Ic.* t. 1095; *Clarke Comp. Ind.* 36. D. oblongata, *Bth. in Gen. Pl.* ii. 260. D. tanacetoides, *Schultz Bip. in Miq. Fl. Ind. Bat.* ii. 38. D. grangeæfolia, *DC. l. c.* 372.

WESTERN HIMALAYA, *Royle*; Simla, alt. 6–7000 ft., *Edgeworth*, *Thomson*. NILGHERRY MTS., alt. 7000 ft., *Wight*, &c.—DISTRIB. Java, Trop. Africa.

Different in habit from *D. latifolia*, being very rigid, often hoary, with smaller leaves and larger heads on peduncles often 2 in. long. *Heads* purple. *Corolla* of ray-fl. shortly funnel-shaped, deeply 3–5-cleft.

3. **D. Hamiltoni,** *Hook. f.*; robust, sparsely pubescent, leaves sessile ½-amplexicaul obovate coarsely toothed, heads globose panicled shortly peduncled, corolla of ♀ fl. short, inflated mouth minute entire, ☿ very few funnel-shaped 4-fid, achenes cuneiform flattened, margins thickened. Cotula sinapifolia, *Roxb. Hort. Beng.* 62; *Wall. Cat.* 3237 D?. C. dichrocephala, *Clarke Comp. Ind.* 150.

ASSAM; at Meteabo, *Hamilton*; Brahmaputra plains, *Herb. Calcutta.*

Annual, stem 6–10 in., much stouter than in any of the other species. *Leaves* 1–2 in., sparsely pubescent on both surfaces. *Heads* ⅙ in. diam.; invol. bracts very short, obtuse, hidden under the ripe achenes; receptacle convex.

** *Receptacle slightly convex.*

4. **D. Benthamii,** *Clarke Comp. Ind.* 36; suberect with ascending branches pubescent, leaves obovate sinuately lobed or spathulate, heads ⅛ in. diam. hemispheric.

KHASIA MTS.; alt. 3–5000 ft., *J. D. H. & T. T., Clarke.*

Habit of *D. latifolia*, but with so different a head and receptacle as almost to suggest generic separation. *Corolla* of ♀ fl. elongate, ovoid or suburceolate, minutely-toothed. Clarke has erroneously described the ♀ as 3 fid. to the base, and stated that Bentham had confounded this with *D. chrysanthemifolia.*

13. CYATHOCLINE, *Cass.*

Erect, annual, odorous herbs. *Leaves* alternate, pinnatisect. *Heads* small, panicled, heterogamous, not rayed; outer fl. ∞-seriate; ♀ fertile, filiform, 2-toothed; disk-fl. ☿, usually sterile, regular, 5-cleft. *Involucre* hemispheric; bracts sub- 2-seriate, lanceolate, acute, margins scarious; receptacle with a contracted base, elevated, top concave, naked. *Anther-bases* truncate. *Style* exserted, of ☿ simple or cleft. *Achenes* minute, oblong, smooth; pappus 0.—DISTRIB. Species all Indian.

1. **C. lyrata,** *Cass.*; *DC. Prodr.* v. 374; sparsely hairy, branched, lower leaves obovate, upper or all pinnatifid, heads in small rounded panicled corymbs rose-purple. *Wight Ic.* t. 1098; *Clarke Comp. Ind.* 37. C. stricta, *DC. l. c.* 374. C. Lawii, *Wight in Calc. Journ. Nat. Hist.* 1846 pt. ii. 159, *not of Dalz.* Tanacetum viscosum, *Wall. Cat.* 3232. T. purpureum, *Don Prodr.* 181. Artemisia hirsuta, *Rottl.*; *Spreng Syst.* iii. 490, *fid. DC.*

WESTERN HIMALAYA; from Kashmir, alt. 1–4000 ft., and Kumaon, alt. 4–5000 ft., to Nipal, *Wallich*, and Bhotan, *Griffith*. OUDE, BEHAR, CHOTA NAGPORE, BENGAL, ASSAM, MUNNYPORE, CHITTAGONG, RANGOON, BIRMA, and the WESTERN PENINSULA.

Stem 1–2 ft., soft. *Leaves* 1–5 in., segments toothed. *Heads* ⅛ in. diam., yellow.—*C. Lawii* is merely a very slender form.

2. **C. lutea,** *Law mss.*; *Wight in Calc. Journ. Nat. Hist.* 1846, pt. ii. 158, t. 2, f. 1; *Ic.* t. 1150; pubescent, stems many from the root slender 3–8 in., radical leaves linear bipinnatifid revolute cauline alternate, segments minute, heads few in subscorpioid cymes yellow. *Clarke Comp. Ind.* 37 (*C. flava* by *error*). C. Lawii, *Dalz. & Gibs. Bomb. Fl.* 124, *not of Wight.*

The CONCAN; on the Ghats, alt. 2–4000 ft., *Law*, &c.

A curious and very beautiful little plant, with stellately spreading radical leaves, 1–2 by ⅙ in., and very numerous slender flexuous scape-like stems branched above, the branches bearing a few, small, yellow heads.

14. GRANGEA, *Forsk.*

Suberect or prostrate villous herbs. *Leaves* alternate, pinnatifid. *Heads* terminal or leaf-opposed, subglobose, not rayed, yellow; outer fl. 1-∞-seriate,

♀, fertile, filiform, outermost 2-fid., inner 2–4-fid.; disk-fl. ☿, fertile, tube very slender; limb campanulate, 4–5-cleft. *Involucre* broadly campanulate; bracts few-seriate, outer herbaceous; receptacle convex or conic, naked. *Anther-bases* obtuse. *Style-arms* of ☿ flattened, cuneate, obtuse or with triangular points. *Achenes* flattened or subterete; pappus cupular.—DISTRIB. Species 3 or 4 tropical Asia and Africa.

1. **G. maderaspatana,** *Poir*; *DC. Prodr.* v. 373; pubescent or villous, stems spreading from the root prostrate, leaves sinuately pinnatifid, heads solitary rarely 2-nate leaf-opposed shortly peduncled, pappus hairs connate into a cylindric fimbriate tube. *Wight Ic.* t. 1097; *Dalz. & Gibs. Bomb. Fl.* 124; *Clarke Comp. Ind.* 37. Artemisia maderaspatana, *Roxb. Hort. Beng.* 61.; *Fl. Ind.* iii. 412. Cotula maderaspatana, *Willd.* C. sphæranthus, *Link Enum.* ii. 344. Grangea sphæranthus, *Koch in Bot. Zeit.*, i. 41.

Throughout INDIA, from the Punjab eastwards and southwards.—DISTRIB. Tropical and subtropical Asia and Africa.

A common weed, growing flat on the ground, forming patches 6–12 in. broad, and more.

15. MYRIACTIS, *Less.*

Erect annuals. *Leaves* alternate, toothed. *Heads* loosely panicled or solitary, homogamous, white with a yellow disk, rayed; ray-fl. 2-∞-seriate, ♀, fertile, small, ligulate, ligules spreading or revolute; disk-fl. ☿, fertile, tubular, 5-fid. *Involucre* hemispheric; bracts few-seriate, narrow, margins scarious; receptacle broad, convex, naked. *Anther-bases* obtuse. *Style-arms* of ☿ narrow, flattened, tips lanceolate. *Achenes* compressed, margined; pappus 0.—DISTRIB. Species 1, or more, Asiatic and African.

1. **M. Wightii,** *DC. in Wight Contrib.* 10; *Prodr.* v. 308; pubescent or villous, leaves ovate or lyrate distantly serrate, upper lanceolate sessile, heads long-peduncled, invol. bracts acute villous, achenes shortly beaked. *Wight Ic.* t. 1091; *Clarke Comp. Ind.* 38. M. javanica, *DC. l. c.*; *Clarke l. c.*

NILGHERRY MTS.; alt. 8000 ft. CEYLON; central province, alt. 5–8000 ft.

A weed 2–3 ft. high; stem rigid, branches divaricating. *Leaves* 1–4 in., petiole winged, upper auricled. *Heads* $\frac{1}{3}$ in. diam., on long strict peduncles.

VAR. *bellidioides*; hirsute, 4–6 in. high, leaves radical rosulate obovate-spathulate quite entire obtuse, heads solitary on a scape-like stem.—Nilgherry Mts., *Wight.*

2. **M. nepalensis,** *Less.*; *DC. Prodr.* v. 308; glabrous villous or hispid, leaves ovate or lanceolate coarsely serrate, heads subpaniculate, invol. bracts acute at length reflexed, achenes mucronate at the top not beaked. *Clarke Comp. Ind.* 38. M. Gmelini, *DC. l. c.* 309. M. oleosa *and* M. gracilis, *Edgew. in Trans. Linn. Soc.* xx. 65 and 66. M. carnosa, *Wall. Cat.* 3219. Botryadenia Gmelini, *Fisch. & Mey. Ind. Sem.* ii. 30; *Regel Sert. Petrop.* t. 23. Lavenia dentata, *Wall. Cat.* 3216 A.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–10,000 ft. KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Central Asia.

A most variable weedy plant, of which I am quite unable to make satisfactory varieties; indeed, as Bentham suggests, it may be only a form of *Wightii.*

3. **M. Wallichii,** *Less.*; *DC. l. c.* 309; very slender, sparsely hairy, leaves elliptic-lanceolate unequally serrate, heads very small on slender pedicels. Lavenia dentata, *Wall. Cat.* 3216 B.

TEMPERATE HIMALAYA; Simla, *Thomson.* NIPAL, *Wallich.* SIKKIM, alt. 9–12,000 ft. *J. D. H.*

I can scarcely think this more than a slender small-headed form of *M. nepalensis,* but if more than one species is to be kept, this must be one of them.

16. **RHYNCHOSPERMUM,** *Reinw.*

A slender puberulous herb with long spreading branches. *Leaves* alternate. *Heads* small, axillary and in spreading leafy panicles, heterogamous, rayed; ray-fl. ♀, 2–3-seriate, fertile, shortly ligulate, white; disk-fl. ☿, fertile, tube short, limb campanulate 4–5-cleft. *Involucre* short; bracts in few series, lanceolate, margins scarious; receptacle flat, naked. *Anther-bases* obtuse or 2-lobed. *Style-arms* of ☿ flattened; tips short, broad, obtuse. *Achenes* compressed, beaked, beak short in the disk, longer in the ray; pappus of 3–5 caducous bristles or 0.

1. **R. verticillatum,** *Reinw. mss.*; *Blume Bijd.* 902; *Clarke Comp. Ind.* 39. Leptocoma racemosa, *Less. in DC. Prodr.* v. 280. Lavenia rigida, *Wall. Cat.* 3215. Carpesium racemosum, *Wall. Cat.* 3201, *in part.* Zollingeria scandens, *Schultz-Bip. in Flora,* 1854, 275.

Temperate Himalaya; from Kashmir, alt. 5000 ft., to Sikkim, alt. 6000 and Bhotan. Khasia Mts., alt, 5000 ft. Birma.—Distrib. Malay Isld., Japan.

Stems 2–3 ft., branches very slender. *Leaves* 1–3 in., membranous, petioled, lanceolate, acuminate entire or coarsely toothed, narrowed into a very slender petiole. *Heads* ⅙ in. diam., on short, rigid, stout, axillary often bracteate peduncles, often one in every axil along the branches.

17. **LAGENOPHORA,** *Cass.*

Scapigerous herbs. *Heads* small, solitary, heterogamous, rayed; ray-fl. ♀, 1–3-seriate, fertile; ligule white, long or short; disk-fl. ☿, often sterile, tubular, limb 5-cleft. *Involucre* short; bracts sub- 2-seriate; receptacle convex, naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ narrow, flattened, tips triangular or lanceolate. *Achenes* of ray compressed, beaked, margins thickened; of disk similar, often narrower and sterile; pappus 0.—Distrib. Species 11–12 Australian, 1 Asiatic, 1 S. American, 1 Sandwich Isld.

1. **L. Billardieri,** *Cass.*; *DC. Prodr.* v. 307; pubescent, leaves radical or subradical oblong or obovate sinuate-toothed pubescent, scape slender. *Clarke Comp. Ind.* 173. L. sundana, *Miq. Fl. Ind. Bat.* ii. 32. L. Harveyi, *Thwaites Enum.* 162.

Khasia Mts., alt. 5–6000 ft. Ceylon, central province, alt. 4–6000 ft.—Distrib. Malay Islds. China. Australia.

Rootstock with thick fibres. *Leaves* 1–2 in. *Scape* 3–4 in., slender. *Heads* ⅙ in. diam.; invol. bracts linear; ligules white, short. *Achenes* obovoid oblong, beak glandular.—I follow Bentham and Clarke in reducing the Indian species to the Australian, though differing greatly in the size of the head.

18. **BRACHYCOME,** *Cass.*

Branched or scapigerous herbs, with the character of *Lagenophora*, except that the ray-flowers are 1-seriate, and that there is sometimes a scanty paleaceous pappus.—Distrib. About 40 species, Australian and New Zealand, with one S. African.

1. **B ? assamica,** *Clarke Comp. Ind.* 40; glabrous, almost shrubby, branches sharply angled, leaves alternate sessile linear dilated upwards, heads small terminal solitary, invol. bracts elliptic or ovate margins scarious, achenes terete striate narrowed above and beaked, pappus 0. ? Synanthera, *Wall. Cat.* 7134. ? Epaltes linearifolia, *DC. Prodr.* v. 461. Ethulia divaricata, *Wall. Cat.* 98, *ex DC.*

Upper Assam; in the Dihong river, on stones.

I know nothing of this plant, which exists only in the Calcutta Herbarium, where Clarke described it. The shape of the achenes differs altogether from that of *Brachycome*. Wallich's 7134 is a plant of Finlayson's, no doubt from Siam; it is a mere scrap, the ray-fl. are in one row, and the achenes are truncate and glandular at the tip. *Ethulia linearifolia* is a Prome species, of which there is no specimen in Wallich's Herbarium; it is probably the Prome plant marked "C. Prome" in Wallich's Catalogue, where the No. 98, placed under 2988, is the numbering of the *Compositæ*.

19. **BOLTONIA,** *L'Her.*

Perennial erect herbs. *Leaves* alternate. *Heads* heterogamous, rayed; ray-fl. ☿, 1–2-seriate, ligule white; disk-fl. ☿, fertile, tubular; limb elongate, 5-cleft. *Involucre* hemispheric; bracts few-seriate, lanceolate, outer smaller; receptacle conic or convex. *Anther-bases* obtuse, entire. *Style-arms* of ☿ flattened; tips short, lanceolate. *Achenes* compressed, margins thickened or winged, faces plane or 3-ribbed or -winged; pappus very short subpaleaceous with sometimes 2-∞ hairs added.—Species 12, N. American and N. subtropical Asiatic.

1. **B. indica,** *Benth. Fl. Hongk.* 174; scaberulous, leaves small oblong-lanceolate entire or subserrate, heads terminal on leafy branches small, invol. bracts 2–3-seriate, pappus scales minute connate below awned. *Kurz in Journ. As. Soc.* 1877, ii. 193; *Clarke Comp. Ind.* 40. Asteromæa indica, *Blume Bijd.* 901; *DC. Prodr.* v. 303. Calimeris integrifolia, *Turcz. in DC. l. c.* v. 259. Hisutsua cantoniensis, *DC. l. c.* vi. 44. Chrysanthemum cuneatum, *Roxb. Fl. Ind.* iii. 436. Calistemon indicum, *Don in Loud. Hort. Brit.* 348. Aster indicus, *Linn.*

UPPER BIRMA, Khakyen hills, *J. Anderson* (cult. ?).—DISTRIB. China, Malay Isld.

Clarke doubts this being a native of the habitat assigned above, which is further beyond the limits of this Flora; it is, however, so likely to occur in India proper, that it is best to retain it.

20. **ASTER,** *Linn.*

Herbs or shrubs. *Leaves* alternate. *Heads* solitary corymbose or panicled, heterogamous, rayed (rarely discoid); ray-fl. ☿, 1–2-seriate, fertile; ligule elongate, white blue or purple; disk-fl. ☿, fertile, tubular, yellow, 5-cleft. *Involucre* campanulate or hemispheric; bracts few- or many-seriate, outer smaller or larger; receptacle flat or convex. *Anther-bases* obtuse, entire. *Style-arms* of ☿ flattened, tips lanceolate long or short. *Achenes* compressed, faces with 1–3 ribs or 0; pappus-hairs few or copious, scabrid, outer sometimes shorter rigid and paleaceous.—DISTRIB. Species about 200, chiefly of N. temperate regions.

Aster Amellus, L., is cultivated in Indian gardens, as is the China Aster *Callistephus chinensis*, Nees (Clarke Comp. Ind. 41). There are no natural limits between the sections of this genus, and some of the Indian species of *Erigeron* may be referable to it, there being no good distinguishing characters for the latter genus.

SECT. I. *Invol. bracts* in few series; outer large green obtuse.—Heads corymbose; stems leafy; leaves sessile.

1. **A. Pseudamellus,** *Hook. f.*; scaberulous, stems simple below slender leafy, leaves sessile oblong acute or obtuse entire or toothed nerves indistinct, branches of corymb slender usually with many elliptic leaves, heads $1\frac{3}{4}$ in. diam., outermost invol. bracts oblong green larger than the inner.

WESTERN HIMALAYA, *Jacquemont*; Kumaon, alt. 8–9000 ft., *Thomson*. Lahul, *Jaeschke*.

Stems 8–18 in., many, stiff, ascending from a woody perennial stock. *Leaves* 1–2½ by ⅓–¾ in., green, uniform on the stem, with very obscure nerves on both surfaces. *Ligules* 12–16, ½–⅓ in., narrow. *Achenes* $\frac{1}{10}$ in., pubescent; pappus rather longer, hairs few, slender, white.—Very like *A. Amellus*, L., but differing in the large outer invol. bracts.

SECT. II. *Invol. bracts* in few series herbaceous.—Heads large, solitary, rarely 2–3 on a stem.

2. **A. himalaicus,** *Clarke Comp. Ind.* 43; laxly villous, stems leafy ascending, radical leaves persistent petioled obovate-spathulate entire or toothed, cauline oblong ½-amplexicaul, heads solitary, outer invol. bracts broadly lanceolate leafy recurved, ligules 40–50 very narrow, achenes silky, pappus single white. Diplopappus elegans, *Herb. Ind. Or. Hf. & T. in part.*

SIKKIM HIMALAYA, alt. 13–15,000 ft., *J. D. H.*; *Clarke.*

A small robust species when alpine, 12–18 in. in lower localities, with a single head, a very leafy involucre and numerous ligules. *Leaves* 1–2 in.; petiole of radical sometimes very long. *Heads* 1½ in. diam. *Achenes* $\frac{1}{10}$ in.; pappus rather longer.

3. **A. tricephalus,** *Clarke Comp. Ind.* 43; puberulous, stems erect leafy, radical leaves deciduous petioled obovate-spathulate, cauline oblong ½-amplexicaul, heads 1–3, outer invol. bracts numerous narrow longer than the inner, ligules 40–50 very narrow. Achenes pubescent, pappus simple reddish. Diplopappus elegans, *Herb. Ind. Or. Hf. & T. in part.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*; *Clarke.*

Clarke suggests the possibility of this being a more developed form of *A. himalaicus*, and this I supposed it to be when I found it in Sikkim; but besides being taller, the invol. bracts are narrower, and the pappus hairs red and much stouter.

4. **A. Stracheyi,** *Hook. f.*; dwarf, stoloniferous, pubescent or villous, radical leaves obovate-spathulate with few distant teeth, scapes ascending one- or few-leaved, heads solitary, invol. bracts few linear-oblong membranous acuminate, ligules 30–40, achenes pubescent or silky, pappus simple reddish. Heterochæta sp., *Herb. Str. & Wint.*

WESTERN ALPINE HIMALAYA; Kumaon, *Wallich*; Pindari, alt. 12,000 ft., *Str. & Wint.*, *Stewart.*

A remarkable little species, with a rambling often branching rootstock and short ascending scape or stem. *Leaves* 1–2 in., coarsely serrate or laciniate. *Heads* ¾ in. diam.; ligules about ½ in. *Achenes* and pappus much as in the preceding, but more silky.

5. **A. Heterochæta,** *Benth. in Gen. Pl.* ii. 272; tomentose or woolly, stemless or stem erect leafy, radical leaves obovate or oblanceolate entire acute, cauline 1–2 oblong ½-amplexicaul, heads solitary very large, outer invol. bracts linear-lanceolate acuminate, ligules 50–60, achenes ⅛ in. glabrate, pappus white or reddish double, outer very short paleaceous. *Clarke Comp. Ind.* 44. A. alpinus, *Thoms. in Herb. Ind. Or. Hf. & T.* Heterochæta asteroides, *DC. Prodr.* v. 282.

ALPINE HIMALAYA and WESTERN TIBET, alt. 14–18,000 ft.—DISTRIB. Altai Mts.

A variable plant (annual?) closely resembling the European *A. alpinus*, but differing from it and from the preceding species in the double pappus. There has been great confusion in the distribution of the single flowered Himalayan *Asters* and *Erigerons* collected by Dr. Thomson and myself, and which have in various herbaria been named *Aster alpinus*, *himalaicus*, and *elegans*, *Diplopappus elegans* and *Erigeron multiradiatus.* The true *A. alpinus*, though Siberian and Central Asiatic, is not known to be Himalayan; and I fail to recognise Clarke's "*A. elegans*, Hf. & T.," described by him at Calcutta as from Sikkim. I find no species having biseriate pappus together with very silky achenes except *A. diplostephioides.*

6. **A. tibeticus,** *Hook. f.*; pubescent or slightly villous, slender, erect, sparingly leafy, radical le. , petioled lanceolate or oblanceolate obtuse or acute quite entire, cauline sessil .near-oblong obtuse, heads solitary rarely 2–3, outer invol. bracts linear acute .ibescent or villous, achenes glabrescent, pappus double white, outer hairs very f. w short subulate.

WESTERN HIMALAYA and TIBET, *Jacquemont*; Piti, Hanli Plains and Pangong Lake, alt. 15–16,000 ft., in salt grassy plains, *Thomson, H. Strachey*; Laptal (N. of Kumaon), alt. 15,000 ft., *Str. & Wint.* (Diplopappus, No. 2.); Karakoram, alt. 14–15,000 ft., *Clarke.*

Perennial, 4–12 in. high. *Leaves* small, radical 1–2 in. including the petiole. *Heads* 1–2 in. diam.; ligules very many, $\frac{1}{2}$–$\frac{3}{4}$ in. long, bright blue. *Achenes* very small, flat, $\frac{1}{12}$ in.; pappus $\frac{1}{6}$ in., hairs few slender.

7. **A. diplostephioides,** *Benth. in Gen. Pl.* ii. 272; erect, robust, villous, stem simple leafy, leaves sessile erect lanceolate or oblong-lanceolate acute quite entire, lower narrowed at the base, heads solitary 3 in. diam., invol. bracts lanceolate leafy, outer often very long, ligules very long and narrow, achenes silky, pappus reddish, outer very short white. *Clarke Comp. Ind.* 45. Heterochæta diplostephioides, *DC. Prodr.* v. 282. Diplopappus diplostephioides, *Herb. Ind. Or. Hf. & T. in part.*

ALPINE HIMALAYA; Kashmir, alt. 8600–11,500 ft., *Falconer*, &c.; Wurdwan, *Lance*; Kunawur, alt 14,000 ft., *Thomson*; Kumaon, alt. 13,000 ft., *Str. & Wint.* (Stenactis sp. 3); Sikkim, alt. 16,000 ft., *J. D. H.*

A very handsome species, 12–18 in. high. *Leaves* 2–3 in. *Invol. bracts* sometimes 1 in.; ligules very many. *Achenes* $\frac{1}{6}$ in., and pappus no longer than in the preceding.—Thomson's Kumaon specimens have broader leaves than the others; Falconer's Kashmir ones are more leafy. Aitchison says the roots are used by the Kashmiris for washing clothes.

SECT. III. *Invol. bracts* in few or many series, narrow, dry or scarious, rarely herbaceous.—Heads small, corymbose or solitary.

8. **A. molliusculus,** *Wall. Cat.* 2972; pubescent or sparsely villous, stems many erect or ascending from a woody rootstock leafy, leaves subsessile linear elliptic or obovate-oblong entire or toothed, heads long-peduncled solitary, invol. bracts linear-lanceolate acuminate, ligules very many short slender, achenes silky, pappus reddish, outer very short white. *Clarke Comp. Ind.* 45. ? A. scaposus, *Klatt in Sitz. Münch. Akad.* 1878, 84. Diplopappus molliusculus, *Lindl. in DC. Prodr.* v. 277. Hersilia simplex, *Klotzsch in Pr. Wald. Reis. Bot.* 75, t. 73.

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 5–8000 ft. TIBET (N. of Kumaon), alt. 15,000, *Str. & Wint.* (Diplopappus, No. 3), and of Sikkim, *J. D. H.*

Stems sometimes branched, 4–12 in., slender, rigid. *Leaves* $\frac{1}{2}$–1 in., acute or obtuse, glabrous or scaberulous. *Heads* rarely 2–3, $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; ligules 20–30, revolute when dry. *Achenes* $\frac{1}{8}$ in.; pappus rather longer.—Tibetan specimens are short, prostrate, with linear leaves and larger flowers. It is difficult (if possible) to distinguish this from *Erigeron multiradiatus.*

9. **A. altaicus,** *Willd. Enum. Hort. Berol.* 881; rigid, scaberulous, stem grooved much branched leafy, leaves sessile linear or oblong obtuse quite entire, heads solitary subcorymbose, invol. bracts linear-lanceolate acuminate, achenes silky, pappus single reddish. *Clarke Comp. Ind.* 46; *Boiss. Fl. Orient.* iii. 158. A. angustifolius, *Lindl. in Royle Ill.* 251, t. 58, *f.* 1. A. spartioides, *Clarke l. c.* Callimeris altaica *and* canescens, *Nees Aster.* 228, 229; *DC. Prodr.* v. 258, 259. Hersilea ramosa, *Klotzsch in Pr. Wald. Reis. Bot.* 75, t. 73. Galatella juncea, *Lindl. in Royle Ill.* 251, t. 58.

WESTERN HIMALAYA; Lahul and Kashmir, alt. 9–13,000 ft., *Jaeschke*, &c.;

KUMAON and WESTERN TIBET, alt. 11–14,000 ft., *Falconer*, &c.—DISTRIB. Affghan and Beluchistan, Central Asia, Altai Mts., China.

Stem 2–3 ft. and branches slender, green. *Leaves* ½–2 in., sometimes contracted at the base, nerves very obscure. *Heads* ⅓–⅔ in. diam., peduncled or sessile; invol. bracts ¼ in.; ligules 20–30, short, blue, revolute when dry, sometimes 0. *Achenes* ⅛ in.; pappus rather longer.—Lindley's *Galatella juncea* is founded on a cultivated specimen of this from the Saharunpore Bot. Gardens, which is glabrous with linear leaves and rounded branches; the achenes are immature, and I do not recognise the difference from those of *altaicus* pointed out by Clarke. A young specimen of *A. altaicus* from Beloochistan presents the same characters.

10. **A. trinervius,** *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 433; glabrous or scaberulous, slender, leafy, leaves sessile or petioled lanceolate obtuse acute or acuminate coarsely serrate, heads corymbose, invol. bracts linear obtuse or acute, ligules 12–15 short, achenes hairy, pappus reddish with a few short slender outer hairs. *Don Prodr.* 177. A. scabridus, *Hook. f. & Thoms. Herb. Ind. Or.*; *Clarke Comp. Ind.* 47. A. Benthami, *Steetz in Seemann Bot. Herald.* 385. A. asperrimus, *Wall. Cat.* 2970. Diplopappus asperrimus, *DC. Prodr.* v. 277 (*excl. syn. Roxb.*). Galatella asperrima, *Nees Aster.* 173. Diplopappus laxus, *Benth. in Hook. Lond. Journ. Bot.* i. 487.

CENTRAL and WESTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5–7000 ft. MISHMI MTS. *Griffith.* KHASIA MTS., alt. 3–6000 ft.—DISTRIB. Japan, N. China.

Stem 2–3 ft., rarely almost glabrous, grooved, sometimes almost hispid. *Leaves* 1–4 in., very variable, rarely oblong and obtuse, base rounded or acute, usually scabrid on both surfaces. *Heads* ⅓–½ in diam.; ligules 10–12, white, narrow. *Achenes* $\frac{1}{10}$ in.; pappus ⅕ in.

11. **A. sikkimensis,** *Hook. f. & Thoms. in Bot. Mag.* t. 4557; erect, leafy, glabrous or puberulous, branches terete flexuous, leaves large sessile or short-petioled lanceolate acuminate entire or subserrate membranous, heads many small corymbose, invol. bracts linear acuminate, achenes hispid 4-ribbed, pappus single white or reddish. *Clarke Comp. Ind.* 42.

EASTERN NIPAL and SIKKIM, alt. 6–12,000 ft., *J. D. H.*

Stems 3–4 ft., much branched, soft. *Leaves* 3–7 by ¾–2 in., narrowed into the broad short ½-amplexicaul petiole, membranous. *Heads* ⅔ in. diam., very numerous, on glabrous or very pubescent branches; peduncles slender or stout; ligules very many, blue. *Achenes* $\frac{1}{12}$ in.; pappus ⅙ in.

SECT. IV. *Invol. bracts* narrow or broad.—Tall herbs with large leaves, corymbosely branched stems above, the branches bearing single, rarely corymbose very large heads.

12. **A. Thomsoni,** *Clarke Comp. Ind.* 48; laxly villous, erect, branched, leaves subsessile broadly ovate acuminate coarsely serrate, heads few large long-peduncled, invol. bracts linear-lanceolate acuminate, achenes hairy, pappus single much shorter than the corolla reddish, hairs subulate. Callimeris flexuosus, *Royle in DC. Prodr.* v. 258; *Royle Ill.* 251, t. 58, f. 2.

WESTERN HIMALAYA; from Nipal to Kashmir, alt. 7–10,000 ft.

An erect laxly branched herb, with flaccid hairs; branches slender, flexuous. *Leaves* 2–4 by 1–2½ in., membranous, base contracted and ½-amplexicaul. *Heads* solitary, 1½–2½ in. diam.; invol. bracts herbaceous; ligules 20–30, ½–¾ in. long. *Achenes* ⅛–⅙, much longer than the pappus.

13. **A. asperulus,** *Nees Aster.* 281; laxly hairy or glabrate, erect, branched, leaves petioled ovate or lanceolate acuminate coarsely serrate, heads few large on slender peduncles, invol. bracts linear or lanceolate acuminate often long and leafy, achenes hairy, pappus hairs white or reddish equalling the corolla with a few short ones. *Wall. Cat.* 2968. A. peduncularis, *Wall. Cat.*

2967; *Clarke Comp. Ind.* 48. Diplopappus asperulus *and* Amphiraphis peduncularis, *DC. Prodr.* v. 277, 344.

WESTERN HIMALAYA, alt. 4–9000 ft., from Chumba to Kumaon.

Very similar in habit and hairiness to *A. Thomsoni*, but readily distinguished by the (usually winged) petioles and pappus. The heads vary greatly in size, from ⅔–1½ in., and the invol. bracts from short narrowly linear with scarious edges, to nearly 1 by ¼ in., green and leafy, and the pappus from white to red.

14. **A. Laka,** *Clarke Comp. Ind.* 49; stems short stout simple from a woody tomentose rootstock, leaves with broad sheath-like petioles, ovate or cordate acute coarsely toothed, heads large solitary on stout peduncles, invol. bracts very large ovate obtuse leafy, achenes hairy, pappus hairs white or reddish equalling the corolla.

WESTERN HIMALAYA; at Laka, near Dhurmsala, alt. 10–11,000 ft., *Edgeworth*; *Clarke*.

A remarkable species, evidently allied to *A. peduncularis*, of which it has the flowers, achenes and pappus, but only 6–8 in. high, with simple stout ascending stems, broader leaves with sheath-like petioles, and very broad obtuse invol. bracts.

EXCLUDED SPECIES.

A. NITIDULUS, *DC. in Wight Contrib.* 9; *Prodr.* 247; is founded on an American cultivated plant, probably *A. lævis*, Willd.

A. AUREUS, *Don Prodr.* 178, with a yellow ray, cannot belong to the genus.

21. BRACHYACTIS, *Led.*

Annual or perennial herbs. *Leaves* alternate. *Heads* solitary, axillary or few in leafy panicles, heterogamous, rayed; ray-fl. ♀, 1–∞-seriate, fertile; ligule minute, bluish or rosy; disk-fl. ☿, fertile, tubular, limb 5-cleft. *Invol. bracts* half as long as the flowers, 2–3-seriate, narrow, outer often leafy; receptacle flat, naked or pitted. *Anther-bases* obtuse, entire. *Style-arms* of ☿ narrow, flattened, tips narrowly lanceolate. *Achenes* narrowly obovate, quite flat; pappus-hairs sub- 2-seriate, outer shorter.—DISTRIB. Species 6, N. American, Central Asian, Siberian, and the Himalayan.

1. **B. menthodora,** *Benth. in Hook. Ic. Pl.* xii. t. 1106; tall, erect, glandular-pubescent, root perennial, leaves oblong-lanceolate or ovate serrate upper sessile ½-amplexicaul, lower long-petioled, recept. not pitted, ligules longer than their styles. B. indica, *Clarke Comp. Ind.* 49. Erigeron anomalum, *DC. Prodr.* v. 293.

ALPINE HIMALAYA; Kashmir, Sind valley, alt. 12,000 ft., *Clarke*; Sikkim, alt. 10–13,000 ft., *J. D. H.*, &c.

Stem stiff, 1–2 ft.; branches short, erect. *Leaves* 1–2 in., cauline decurrent. *Heads* ½–⅔ in. diam., chiefly towards the tips of the stem or branches; invol. bracts few, linear, pubescent, 1–2 outer often much larger and leafy; fl. pale blue. *Achenes* $\frac{1}{10}$ in., nearly glabrous, margins thickened; pappus ⅙ in. reddish.—Whole plant smells like mint, but more sweetly.

2. **B. umbrosa,** *Benth. in Hook. Ic. Pl. under* t. 1106; small, annual, glandular and villous, leafy, branched from the base, leaves obovate lobulate or cuneate narrowed into the petiole, ligules minute. B. wangtuensis, *Clarke Comp. Ind.* 61. Conyza umbrosa, *Karel & Kiril. in Led. Fl. Ross.* ii. 498. C. Roylei, *DC. Prodr.* v. 381. Vernonacea, *Griff. Itin. Notes*, 322, *n.* 1259.

WESTERN HIMALAYA and TIBET; from Kashmir to the Karakoram, alt. 8–12,000 ft.; Lahul, *Jaeschke.*—DISTRIB. Alatau Mountains. Afghanistan.

Branches 4–8 in., rarely more, ascending, leafy. *Leaves* ½–⅔ in. *Heads* many, ⅛ in. diam., often one in every leaf-axil, sessile or long-peduncled. *Achenes* $\frac{1}{12}$ in.,

sparingly silky; pappus scanty, $\frac{1}{8}$ in. long, reddish.—In luxuriant specimens the leaves are 2–3 by 1–1$\frac{1}{2}$ in. and very membranous.

3. **B. robusta,** *Benth. in Hook. Ic. Pl. under* t. 1106; stout, annual, glandular-pubescent, erect, branched, leaves obovate toothed narrowed into a short petiole, receptacle broad. Conyza pubescens, *DC. Prodr.* v. 381.

WESTERN HIMALAYA, alt. 4–14,000 ft., from Kashmir to Kumaon and Gurwhal, *Falconer, Edgeworth,* &c. WESTERN TIBET, alt. 12–14,000 ft., *Thomson,* &c.

Possibly only a large form of *B. umbrosa,* the heads are $\frac{1}{2}$ in. diam., but the achenes and pappus are no longer.

22. ERIGERON, *Linn.*

Characters of ASTER, but ray-flowers usually in several rows with very slender short or long ligules, and the achenes narrower. *Pappus* often double, the outer of a few short hairs or bristles.—DISTRIB. Species about 100, chiefly natives of N. Temp. regions, extremely variable and difficult to discriminate from one another, and certain of them from species of *Aster.*

E. linifolius, *Willd.* (*Boiss. Fl. Orient.* iii. 169), is found as an escape, or a garden weed, in the Punjab and elsewhere. It is a stout erect hirsute herb, with leafy stem and branches, the leaves are close-set, 2–2$\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{3}$ in., serrated here and there, the numerous peduncled heads are subpaniculate and $\frac{1}{3}$–$\frac{1}{2}$ in. in diam. It is the *Conyza angustifolia* of Thwaites Herb. (C. P. 3928) but not of Hamilton.

1. *Species of the tropical region.*

1. **E. canadensis,** *Linn.*; *Boiss. Fl. Orient.* iii. 163; annual, very slender, much branched above, pubescent hirsute or nearly glabrous, leafy, leaves narrow linear or linear-lanceolate entire or toothed, heads $\frac{1}{6}$–$\frac{1}{4}$ in. diam. peduncled in elongated branched panicles, invol. bracts narrow glabrate, ligules erect pink, pappus dirty white.

WESTERN HIMALAYA and the PUNJAB, ascending to 3000 ft. ROHILKUND, *Thomson.*—DISTRIB. All warm countries, assumed to be a native of N. America.

Stem 6 in.–3 ft. and branches erect, more slender than in any other Indian species, and the heads smaller. *Invol. bracts* acuminate; ligules pale rosy or purplish, scarcely exceeding the pappus. *Achenes* $\frac{1}{16}$ in. narrow, flat, nearly glabrous; pappus $\frac{1}{8}$ in.

2. **E. asteroides,** *Roxb. Fl. Ind.* iii. 432; pubescent or villous, branched, radical leaves obovate petioled cauline obovate or oblong $\frac{1}{2}$-amplexicaul all toothed or lobulate, heads $\frac{1}{4}$–$\frac{1}{2}$ in. peduncled solitary or subcorymbose, ligules capillary blue rather longer than the reddish or dirty white pappus. *Wall. Cat.* 3052 A. E. hispidum, *DC. in Wight Contrib.* 9; *Prodr.* v. 292; *Clarke Comp. Ind.* 54. E. sublyratum, *Roxb. in DC. l. l. c. c.*; *Clarke l. c.* 55, 301. E. hirsutum, *Wall. Cat.* 2976. E. ægyptiacum, *Kurz in Journ. As. Soc.* 1877, ii. 193. Conyza graveolens, *Wall. Cat.* 3106. C. ægyptiaca, *Herb. Ind. Or. Hf. & T., not of Ait.* C. Jerdoni, *Clarke Comp. Ind.* 62.

TROPICAL HIMALAYA; Nipal, *Wallich*; Sikkim, ascending to 4000 ft., *J. D. H.* BENGAL and the WESTERN PENINSULA.

A coarse annual, 1–2 ft. high, erect, or in a dwarf state decumbent, closely resembling *Conyza ægyptiaca.* *Cauline-leaves* $\frac{1}{2}$–1 in., numerous. *Invol. bracts* 1–2-seriate, very narrow with hair points, much shorter than the pappus. *Achenes* very minute, $\frac{1}{30}$ in., nearly glabrous, flat, pale.—*Blumea pubiflora,* under which Roxburgh's *E. asteroides* is quoted by DC. as a synonym, appears from the description to be a true *Blumea,* but of Wallich's 2975 *Erigeron asteroides,* Roxb. also quoted under the same

plant, there is no specimen in the Wallichian Herbarium, nor is there of *Conyza graveolens* (Wall. Cat. 3106, Herb. Madr.), which is referred by DC. to *E. hispidum.*

2. *Species of the temperate and Alpine regions.*

3. **E. andryaloides,** *Benth. in Herb. Kew*; perennial, densely softly tomentose or woolly, leaves petioled spathulate entire or lobulate, heads $\frac{2}{3}$ in. diam. on a very naked scape-like stem, invol. bracts linear acute, ligules short broad revolute, pappus white then reddish. *Clarke Comp. Ind.* 52. Conyza andryaloides, *DC. Prodr.* v. 377.

WESTERN HIMALAYA; Lahul and Kunawur, *Royle, &c.* WESTERN TIBET, alt. 9–18,000 ft., *Falconer*, &c.

Rootstock woody, very stout. *Leaves* 1–2 in., densely crowded. *Scapes* $\frac{1}{6}$ in., with one or two small linear leaves or 0. *Invol. bracts* woolly or pubescent. *Achenes* $\frac{1}{6}$ in. flat narrow silky; pappus rather longer, 1-seriate.

4. **E. monticolus,** *DC. Prodr.* v. 286; perennial, glabrous or sparsely hairy, leaves petioled, radical rosulate obovate-lanceolate acute subentire, heads solitary or few on a slender scape-like stem, ligules many twice as long as the pappus. *Wall. Cat.* 2977.

TEMPERATE and ALPINE HIMALAYA; Nipal, *Wallich*; Kumaon, *Strach. & Winterb.*

In its usual form a scapigerous plant, but sometimes branching, and then apparently passing into *E. bellidioides.*

5. **E. alpinus,** *Linn*; *Boiss. Fl. Orient.* iii. 165; biennial or perennial, hispidly hairy or glabrate, radical leaves petioled spreading obovate or oblong-obovate, cauline usually sessile obovate or oblong, heads solitary or corymbose $\frac{1}{2}$–$\frac{3}{4}$ in. diam., invol. bracts pubescent tomentose or woolly, ligules rarely exceeding the length of the reddish pappus, achenes sub-silky. E. acre, *Clarke Comp. Ind.* 52; *Herb. Ind. Or. Hook. f. & T.*

Throughout the TEMPERATE and ALPINE WESTERN HIMALAYA, the KHASIA and NILGHERRY MTS.—DISTRIB. Mountains of the N. temp. zone.

I have in vain tried to draw any distinction between this common Himalayan *Erigeron* and *E. alpinus*, which is itself in my opinion only a form of *E. acris*; nor does the difficulty end here, for I find it almost as difficult to separate *E. bellidioides* and *multiradiatus* by any definite characters, whilst *E. monticolus* seems to pass into the *bellidioides* on one hand, and on the other, into *E. andryaloides.* The following varieties are not strictly definable, they represent prevalent forms.

VAR. 1. *alpinus proper*; hispid heads subsolitary $\frac{3}{4}$ in. diam., invol. bracts subulate-lanceolate, ligules longer than the pappus.

VAR. 2. *multicaulis*; more glabrous, stem much branched from the base, branches slender, heads rather small usually long-peduncled corymbose, pappus hairs scanty shorter ones very few. *E. multicaulis*, Wall. Cat. 3286; DC. Prodr. v. 292. Temperate and Alpine Himalaya, from Nipal westward and Western Tibet.

VAR. 3. *semibarbata*; more robust and hairy or hispid, leaves often 3-nerved, cauline $\frac{1}{2}$-amplexicaul or narrowed at the base, heads 2–3 in. diam. few larger, peduncles often thickened at the top, the lateral often spreading, tube of ray-fl. with long hairs, ligules twice as long as the pappus. *E. semibarbatus* and ? *Roylei*, DC. Prodr. v. 292. Western Himalaya, abundant.

VAR. 4. *khasiana*; erect, hairy, stem usually unbranched below, radical leaves very crowded obovate-lanceolate, cauline sessile, heads few peduncled, ligules twice as long as the red rather copious pappus the shorter hairs of which are rather numerous. E. bellidioides, *var.* khasiana, *Clarke Comp. Ind.* 55. Khasia Mts., alt. 3–6000 ft., Bhotan, *Griffith.*

VAR. 5. *Wightii*; stout, hispid, stem usually unbranched below, radical leaves many oblong-lanceolate, cauline narrowed at the base, heads 2–3 in. diam. few long-peduncled, ligules as long as the copious pappus, shorter hairs rather numerous. E.

Wightii, *DC. Prodr* v. 286; *Wight. Ic.* t. 1090. E. multicaulis, *var.* madurensis and E. Leschenaultii, *DC. l. c.* 292. Neilgherry Mts., alt. 7500 ft. Wight describes the achenes as glabrous, but figures them hispid.

VAR. 6. *uniflora*; subscapigerous, hirsute, radical leaves obovate-lanceolate, cauline linear-oblong, heads subsolitary, involucre woolly, bracts sometimes herbaceous and recurved, achenes about as long as the pappus. E. acris, *var. θ.* erigeroides, *Clarke Comp. Ind.* 54. Heterochæta erigeroides, *DC. Prodr.* v. 282.—Alpine Western Himalaya and Tibet, alt. 10–17,000 ft.

6. **E. bellidioides,** *Benth. in Gen. Pl.* ii. 280; perennial, glabrous or nearly so, stem very slender grooved sparingly branched, radical leaves lanceolate acutely serrate, cauline sessile oblong or linear-oblong entire or crenate, heads $\frac{1}{3}$ in. diam. few long-peduncled, ligules thrice as long as the red pappus, shorter hairs few, achenes sub-silky. *Clarke Comp. Ind.* 55. Aster bellidioides, *Ham. in Don Prodr.* 177; *Wall. Pl. As. Rar.* ii. t. 101; *Cat.* 2978. Stenactis bellidioides, *Nees Aster.* 274.

CENTRAL and WESTERN HIMALAYA, from Kashmir to Nipal, alt. 5–10,000 ft.

This passes into slender forms of *A. alpinus*, var. *multicaulis*, but is usually distinct, and perhaps into *E. monticolus.*

7. **E. multiradiatus,** *Benth. in Gen. Pl.* ii. 280; hirsute or pubescent, erect, stem stout or slender simple or branched sparingly above, leaves all cauline obovate or lanceolate obtuse or acute entire or 1–2-toothed, heads 2–3 in. diam. solitary or few long-peduncled, ligules 2–3 times longer than the red pappus very numerous, short pappus hairs few, achenes $\frac{1}{12}$ in. nearly glabrous. *Clarke Comp. Ind.* 56. Aster multiradiatus, *Wall. Cat.* 2969. A. inuloides, *Don Prodr.* 178. Stenactis multiradiata, *Lindl. in DC. l. c.* 299. ? Diplopappus Roylei, *DC. Prodr.* v. 276.

TEMPERATE and ALPINE HIMALAYA, from Kashmir and Kumaon, alt. 7–9000 ft., and to Sikkim, alt. 9–12,000 ft.

The smaller states of this are difficult to distinguish from *E. alpinus*, var. *semibarbata*, but the heads are larger, the ligules are very numerous, often $\frac{3}{4}$ in. long, and the involucres are broad and villous. The achenes resemble those of *E. alpinus.* In respect of the double pappus and habit this comes very near some Sikkim asters, especially *A. molliusculus.*

DOUBTFUL SPECIES.

E. AUGUSTISSIMUS, *Lindl. in DC. Prodr.* v. 286, is a doubtful plant. The Afghan plant of Griffith, doubtfully referred to by Clarke Comp. Ind. 51., is certainly not Lindley's *E. augustissimus.*

ERIGERON, sp.; hispid and glandular-pubescent, leaves 2–3 in. sessile obovate- or oblong-lanceolate acute entire or toothed, heads $\frac{3}{4}$ in. diam. crowded subglobose, invol. bracts linear, ligules rather longer than the yellowish pappus very numerous and narrow, achenes small unripe.—Mountains near Peshawur, *Stewart* (Afghanistan, Safed Koh, alt. 9000 ft., *Collett*).

23. **MICROGLOSSA,** *DC.*

Slender shrubs, sometimes climbing. *Leaves* alternate, quite entire. *Heads* small, corymbose or panicled, heterogamous; ray-fl. ♀, 1–∞-seriate, fertile, ligule minute, white; disk-fl. few or many, ☿, fertile, tubular; limb dilated, 3–4-fid. *Involucre* campanulate; bracts ∞-seriate, narrow, outer shorter; receptacle flat, naked or nearly so. *Anther-bases* obtuse, entire. *Style-arms* of ☿ flattened, tips long lanceolate. *Achenes* angled; pappus-hairs copious, slender, 1–2-seriate, rather unequal.—DISTRIB. About 6 Asiatic and African species.

1. **M. volubilis,** *DC. Prodr.* v. 320; subscandent, branches grooved, leaves petioled ovate-lanceolate obscurely-toothed glabrous or pubescent beneath, heads ⅛ in. diam. peduncled clustered on the branches of rounded corymbs, achenes compressed 4-angled puberulous, pappus ⅛ in. red much longer than the minute achenes. *Clarke Comp. Ind.* 57; *Kurz For. Fl.* ii. 82. Conyza volubilis, *Wall. Cat.* 3057. Erigeron pyrifolius, *Benth. Fl. Hongk.* 176.

KHASIA MTS., ASSAM, NAGA HILLS, CACHAR, BURMA, and from PEGU to PENANG.—DISTRIB. Malay Islds., China.

A rambling shrub. *Leaves* 1½–2½ in.; petiole very slender. *Heads* numerous, invol. bracts lanceolate; ligules very minute.

2. **M. albescens,** *Clarke Comp. Ind.* 59; erect, branches faintly grooved, leaves shortly petioled lanceolate acuminate quite entire or subserrate hoary beneath, heads ⅓ in. diam. peduncled loosely clustered on the branches of a spreading corymb, achenes puberulous obscurely 5-angled, pappus red not longer than the achenes. M. cabulica *and* M. Griffithii, *Clarke Comp. Ind.* 57, 58. Aster cabulicus, *Lindl. in Bot. Reg.* 1843; *Misc.* 62; *Boiss. Fl. Orient.* iii. 158. A. albescens, *Wall. Cat.* 2974. A. ferrugineus, *Edgew. in Trans. Linn. Soc.* xx. 64. Amphiraphis albescens, *DC. Prodr.* v. 343. Conyza conspicua, *Wall. Cat.* 3066. Homostylium cabulicum, *Nees in Linnæa,* xviii. 513.

TEMPERATE HIMALAYA; from Kishtwar, alt. 7–9000 ft., to Sikkim, alt. 9–12,000 ft., and Bhotan.

A stouter plant than *M. volubilis*; leaves 2–3 in., narrowed into the short petiole; corymbs often 8 in. diam., with lilac conspicuous ligules.—The name *cabulicus*, founded on the mistaken supposition that the plant is a native of Affghanistan, must be abandoned.

3. **M. zeylanica,** *Benth. in Gen. Pl.* ii. 282; branches grooved and leaves beneath hoary, leaves narrowly lanceolate acuminate serrulate or entire, heads ⅛ in. shortly peduncled crowded on the branches of a spreading corymb, ligules short suberect, pappus $\frac{1}{10}$ in. red twice as long as the hairy angled achenes. *Clarke Comp. Ind.* 58. Amphiraphis zeylanica, *DC. Prodr.* vii. 279. Solidago zeylanicus, *Arn. Pugill.* 9.

TRAVANCORE; Pulney Mts., *Wight.* CEYLON, abundant throughout the island, ascending to 6000 ft.

An erect shrub. *Leaves* 3–4 in., narrowed into a petiole of ¼–⅓ in. *Heads* very numerous, small and crowded; invol. bracts very small, broadly linear, obtuse.

24. CONYZA, *Less.*

Herbs. *Leaves* alternate, entire, toothed or cut. *Heads* corymbose or panicled, rarely solitary, heterogamous, disciform; outer fl. ♀, 2–∞-seriate, filiform, rarely ligulate, 2–3-toothed, fertile, pale-cold; inner ☿, all or mostly fertile, yellow, tubular, limb 5-toothed. *Involucre* campanulate; bracts 2–∞-seriate, narrow (except *C. rufa*), outer smaller; receptacle flat or convex, naked or pitted and fimbriate. *Anther-bases* obtuse, entire. *Style-arms* of ♀ flattened, tips long or short. *Achenes* minute, compressed; pappus slender, 1-seriate.—DISTRIB. Species 50, chiefly tropical and subtropical.

1. **C. semipinnatifida,** *Wall. Cat.* 3058; erect, villous or hirsute, leaves obovate-spathulate or oblanceolate acutely or obtusely lobed or cut, heads crowded ¼ in. diam. globose yellow, invol. bracts slender, achenes $\frac{1}{30}$ in. long glandular, pappus $\frac{1}{12}$ in. white. *DC. Prodr.* v. 382; *Clarke Comp. Ind.* 62.

SOONDERBUNDS, at Burisal, *Clarke.* BIRMA, from Prome and Martaban southwards, on the banks of large rivers, *Wallich, Kurz.* UPPER ASSAM; Mishmi, *Griffith.*

Annual, 1–2 ft., stem stout. The Mishmi species is much less hairy than the Birma ones, with leaves more sharply toothed.

2. **C. japonica,** *Less.*; *DC. Prodr.* v. 383; erect, villous or woolly, rarely glabrate, leaves sessile obovate spathulate oblong or lanceolate serrate or crenate, heads $\frac{1}{3}$ in. diam. globose, invol. bracts lanceolate with scarious edges, achenes $\frac{1}{24}$ in. nearly glabrous, pappus $\frac{1}{8}$ in. reddish. C. veronicæfolia, *Wall. Cat.* 3005; *DC. l. c.* 382; *Clarke Comp. Ind.* 62. C. stricta, *Wall. Cat.* 3044; C. multicaulis, *DC. l. c.* 383. ? C. petiolaris, *DC. l. c.*; *Wall. Cat.* 3282 (*no specimen in Herb. Wall.*).

TROPICAL HIMALAYA; from Simla eastwards, and the KHASIA MTS., ascending to 5000 ft. PEGU and MARTABAN, ascending to 7000 ft., *Kurz.* DISTRIB. Affghanistan, China and Japan.

Annual, 6–12 in., rarely more; stem often simple with well developed radical leaves. The Sikkim specimens are more slender and glabrous than any others.

3. **C. ægyptiaca,** *Ait.*; *DC. Prodr.* v. 382; erect, hirsute, leaves lanceolate or obovate-lanceolate unequally pinnatifidly lobed, lobes ascending, heads $\frac{1}{2}$ in. diam. crowded, invol. bracts lanceolate edges scarious, achenes $\frac{1}{16}$ in. sparingly hairy, pappus $\frac{1}{8}$ in. reddish. Conyza hirsuta *and* asteroides, *Wall. Cat.* 3007 B. *partly and* 3052 B. *partly.* ? A. Jerdoni, *Clarke l. c.* 62.

TROPICAL WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, *Thomson.*—DISTRIB. Africa, China, Japan, Australia.

The more deeply cut leaves and larger heads, distinguish this from *C. japonica.* There are no materials for determining *C. Jerdoni*, which Mr. Clarke thinks is *ægyptiaca.*

4. **C. viscidula,** *Wall. Cat.* 3006; pubescent and glandular, stem tall corymbosely branched, leaves lanceolate narrowed at both ends entire or serrate, heads $\frac{1}{3}$ in. peduncled in loose corymbs, invol. bracts lanceolate edges scarious, achenes $\frac{1}{40}$ in. obovoid glabrous, pappus $\frac{1}{6}$–$\frac{1}{4}$ in. reddish. *DC. Prodr.* v. 383; *Clarke Comp. Ind.* 63. C. disticha, striata *and* travancorensis, *Wall. Cat.* 3024, 3065, 3067; *DC. l. c.* 383, 384. C. serrulata, *Wall. Cat. sub.* 3024 B. C. Wallichii, *DC. l. c.* 384. C. polycephala, *Edgew. in Trans. Linn. Soc.* xx. 66.

SUBTROPICAL HIMALAYA, from Simla eastwards, ascending 4000 ft., and southwards to TRAVANCORE, CEYLON, and BIRMA.—DISTR. Philippine Islds., Java, New Caledonia, Australia.

Much the tallest and most branched of the Indian species, with very uniform leaves 2–4 in. long, and usually loosely cymose heads.

5. **C. angustifolia,** *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 429; woody below, scaberulous, branches slender, leaves sessile long narrowly linear serrate, heads $\frac{1}{4}$–$\frac{1}{3}$ in. in slender open peduncled cymes, invol. bracts lanceolate margins broad scarious, achenes minute sparsely silky, pappus $\frac{1}{10}$ in. reddish very caducous as a whole. *DC. Prodr.* v. 383; *Clarke Comp. Ind.* 63; *Ham. in Wall. Cat.* 3071.

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.*, &c.

Roxburgh, who describes this from Calcutta Garden specimens, says it is annual 4–8 ft. high, with a simple erect stem; he did not know its native country, and probably procured it from Hamilton, whose specimens in Wallich's herbarium are called *angustifolia.* The Sikkim specimens are much smaller, 2–3 ft. Hamilton no doubt procured it from the foot of the Sikkim hills. A specimen of a very similar plant is in Griffith's Affghan Herbarium (n. 918), but it is too young for determination.

6. **C. stricta,** *Willd.*; *DC. Prodr.* v. 389; hoary or scaberulously pubescent, excessively corymbosely branched and leafy, leaves from narrowly linear to spathulate-obovate entire or toothed rarely pinnatifid, heads $\frac{1}{8}$ in. diam. extremely numerous peduncled corymbose, invol. bracts narrowly lanceolate,

achenes about $\frac{1}{40}$ in. puberulous, pappus $\frac{1}{16}$ in. reddish. C. absinthifolia, *DC. in Wight Contrib.* 16; *Prodr. l. c.* 383; *Clarke Comp. Ind.* 64; *Dalz. & Gibs. Bomb. Fl.* 124. C. pinnatifida, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iv. 430. Erigeron trisulcum *and* pinnatifidum, *Don Prodr.* 171, 172. Blumea trisulca, *DC. l. c.* 440. Baccharis trifurcata, *Trev. in Nov. Act. Nat. Cur.* xiii. 201, t. 13.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 5000 ft. KHASIA MTS., alt. 2–6000 ft. BEHAR and the WESTERN GHATS to TRAVANCORE, PEGU and BIRMA.—DISTRIB. Eastern Africa.

The excessively fastigiately branched and leafy habit of this species, and its minute heads, distinguish it from all others.

7. **C. adenocarpa,** *Dalz. & Gibs. Bomb. Fl.* 125; pubescent and scabrous, stem rather woody below, leaves linear or oblong $\frac{1}{2}$-amplexicaul entire or distantly toothed, heads $\frac{1}{8}$ in. diam. in terminal few-fld. corymbs, invol. bracts lanceolate acute, achenes $\frac{1}{40}$ in. glandular and puberulous, pappus $\frac{1}{10}$ in. reddish.

The WESTERN DECCAN and the CONCAN, *Dalzell*; highest hills east of Bombay, *Ritchie.*

Apparently shrubby below, branches 6–10 in. high. *Leaves* 1–2 in., usually rounded at the apex, broad and 2-lobed at the base. *Heads* like those of *C. stricta.*

8. **C. rufa,** *Wall. Cat.* 3079; tomentose or villous, branched from the base, branches spreading or prostrate, leaves sessile obovate or oblong-obovate or linear-oblong coarsely toothed, heads subglobose $\frac{1}{3}$ in. diam., invol. bracts broad ovate acute green with membranous margins, achenes $\frac{1}{36}$ in. pubescent with curled hairs, pappus $\frac{1}{6}$ in. reddish shining very caducous as a whole. *DC. Prodr.* v. 384; *Clarke Comp. Ind.* 65. C. marginata, *Edgew. in Trans. Linn. Soc.* xx. 67. C. hirsuta, *Wall. Cat.* 3007 B. *partly.*

Annual, corymbosely branched, branches 4–8 in. long. *Leaves* 1–2 in.—The broad invol. bracts with defined membranous margins distinguish this from all other Indian species.

EXCLUDED SPECIES.

C. SERRULATA, *Wall. of Clarke Comp. Ind.* 64, is not the plant of Wallich, and is altogether doubtful.

C. PATULA, *Ait. Hort. Kew* iii. 184; *Miller Icon.* t. 247; referred to as *Cyanopis pubescens,* in DC. Prodr. v. 69, is probably a *Vernonia.* See Eupatorium glabrum, *Wall. Cat.* 3283, *ex Herb. Heyne* (Decaneuron glabrum, *DC. l. c.* 67), of which there is no specimen in Wallich's Herbarium.

25. THESPIS, *DC.*

A branched glabrous annual. *Leaves* alternate, toothed. *Heads* minute, globose, sessile in globose clusters on the branches of dichotomous cymes, heterogamous, disciform, yellow; outer fl. ♀, many-seriate, often without corolla, fertile; disk.-fl. ☿, few, regular, sterile, tube very short, limb narrowly campanulate 4-fid. *Involucre* hemispheric; bracts broad, obtuse, herbaceous, sub-2-seriate; receptacle flat or convex, naked. *Anther-bases* obtuse, entire or 2-fid. *Style-arms* short, flattened, subacute. *Achenes* of ♀ small, hardly ribbed; pappus-hairs about 10, short, dilated.

1. **T. divaricata,** *DC. Prodr.* v. 375; *Deless. Ic. Sel.* iv. t. 20; T. erecta, *DC. l. c.*; *Clarke Comp. Ind.* 65. Cotula sinapifolia, *Roxb. in Wall. Cat.* 3237, G.

TROPICAL HIMALAYA; Nipal and Sikkim, *Wallich,* &c. EASTERN BENGAL, ASSAM, SILHET, CACHAR, BIRMA and TENASSERIM.

A variable weed from 3 in. to 2 ft. high, robust with spreading branches. *Leaves* sessile or narrowed into a petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., obovate, toothed. *Heads* $\frac{1}{8}$ in. diam.

TRIBE IV.—**INULOIDEÆ.**

26. **BLUMEA,** *DC.*

Annual or perennial, glandular pubescent or woolly herbs. *Leaves* alternate, usually toothed or lobed. *Heads* corymbose panicled or fascicled, rarely racemed, heterogamous, disciform, purple rosy or yellow; outer fl. ∞-seriate, ♀, fertile, filiform, 2–3-toothed; disk.-fl. ☿, few, fertile, tubular, slender, limb 5-toothed. *Involucre* ovoid or campanulate; bracts ∞-seriate, narrow, acute, soft or herbaceous, outer smaller; receptacle flat, naked. *Anther-bases* sagittate, tails small, slender. *Style-arms* of ☿ flattened or almost filiform, rarely connate with the adjoining anthers. *Achenes* small, subterete or angled, ribbed or not; pappus 1-seriate, slender, often caducous.—DISTRIB. Species about 60, tropical and subtropical Asiatic, African and Australian.

This genus is eminently characteristic of India, and the species may be called the Groundsels of that country. There is no more unsatisfactory genus than this; it is distinguished from *Laggera* only by the tailed anther-cells, and this is not a very constant character, the anthers of some states of *B. virens* having no tails, whilst forms of *Laggera* have them; Kurz, indeed, suggests (with much probability) that some Laggeras are sexual forms of Blumeas. Clarke finds generally in *Blumea*, that functionally ♀ heads occur, the disk-flowers, though ☿ in form, having only rudimentary stamens, and that in the case of the common *B. oxyodonta* he has never found perfect ☿ flowers, nor has Kurz. The divisions of the Genus here proposed are most unsatisfactory, and I fear that the specific diagnoses are not much better. The glabrous or pubescent receptacle is very difficult to see; the size of the head is tolerably constant; the form and number of the invol. bracts are difficult to describe; the very minute achenes are tolerably uniform; the foliage is sportive to an extraordinary degree, as is the pubescence; gland-hairs are common to most species, but the amount varies with the dryness of the locality. I have not been able to follow Clarke's disposition of the species at all closely, they want a careful study *in situ*, and under cultivation.

SECT. 1. *Heads* few, small, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., solitary or 2 and peduncled at the ends of the branches. Small, annual herbs, erect or prostrate; flowers yellow.

1. **B. amplectens,** *DC. in Wight Contrib.* 13; *Prodr.* v. 483; sparsely softly hairy or glabrous, divaricate branches spreading from the base, leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. $\frac{1}{2}$-amplexicaul oblong or obovate obtuse or acute coarsely toothed, heads solitary on the branchlets peduncled $\frac{1}{4}$–$\frac{1}{3}$ in. diam., invol. bracts very slender inner hair-pointed, recept. glabrous, corolla yellow, lobes of ☿ hairy, achenes oblong, pappus reddish. *Clarke Comp. Ind.* 71; *Dalz. & Gibs. Bomb. Fl.* 125; *Thwaites Enum.* 163 *partly* (*C. P.* 1730). Conyza amplectens, *Wall. Cat.* 3096. C. obliqua, *Willd. Sp. Pl.* iii. 1930. C. amplexicaulis, *Lamk. Dict.* ii. 84. Erigeron obliquum, *Linn. Mant.*

CENTRAL INDIA and WESTERN PENINSULA; abundant in BENGAL, chiefly near the coast and CEYLON.

The following varieties are according to Clarke, they are with difficulty limitable.

VAR. 1. *typica*; softly hairy or glabrate, leaves oblong toothed.

VAR. 2. *arenaria*, leaves obovate-oblong sparingly toothed usually more villous beneath. B. arenaria, *DC. in Wight. Contrib.* 13; *Prodr.* v. 433. Conyza villosa. *Wall. Cat.* 3105.

VAR. 3. *pubiflora*, leaves toothed, peduncles stout, heads large $\frac{1}{3}$ in. B. pubiflora, *DC. Prodr.* v. 434. Erigeron asteroides, *Wall. Cat.* 2975, B.—Extends to Bundelkund and N.W. India.

VAR. 4. *maritima*; bushy, glabrous, glandular, leaves small, heads large.—Near the sea, Andaman Islds., Pegu, Soonderbunds and round the coast to Scinde.

VAR. 5. *tenella*; almost glabrous.

2. **B. bifoliata,** *DC. in Wight Contrib.* 14; *Prodr.* v. 434; often prostrate with ascending branches, pubescent villous or glabrate, branched from the base, leaves 1–3 in. sessile obovate or oblong serrate obtuse or acute 2 uppermost on the branches sub-opposite, heads $\frac{1}{4}$–$\frac{1}{3}$ in. solitary on the branchlets peduncled, inner invol. bracts acuminate, receptacle glabrous, corolla yellow, lobes of ☿ hairy, achenes narrowly oblong with 4–5 hairy angles, pappus white. *Dalz. & Gibs. Bomb. Fl.* 145; *Kurz in Journ. As. Soc.* 1877, ii. 186; *Clarke Comp. Ind.* 72. B. amplectens, *Thwaites Enum.* 163 *in part* (C.P. 3523). B. oligocephala, *DC. in Wight Contrib.* 13; *Prodr.* v. 434. B. anagallidifolia, *DC. Prodr.* v. 434. Conyza bifoliata, *Willd.*; *Roxb. Fl. Ind.* iii. 431. C. foliolosa, anagallidifolia *and* amplexicaulis, *Wall. Cat.* 3092, 3098, 3104.

BENGAL, the WESTERN PENINSULA, BIRMA, the MALAY PENINSULA and CEYLON.

Best distinguished from *B. amplectens* by the serrate (not dentate) leaves, the two upper of which on each branch are usually opposite, and by the tips of the invol. bracts not being hair-pointed. *B. anagallidifolia* is a very small leaved state.

SECT. II. *Heads* many, villous, small, $\frac{1}{4}$–$\frac{1}{2}$ in. diam. ($\frac{1}{2}$–$\frac{2}{3}$ in *B. hieracifolia*), more or less clustered and forming dense oblong spikes or contracted panicles at the top of the stem, exceptionally arranged in loose open corymbs.—Erect or ascending stout or slender herbs, usually very villous silky or woolly, often glandular, rarely 2 ft. high. Leaves toothed or serrate, seldom deeply gashed. Pappus white. (Corymbs often loose in *B. barbata*, and sometimes in all the others. Branches prostrate in *B. nodiflora*. See *B. Belangeriana* in Sect. IV.)

3. **B. Wightiana,** *DC. in Wight Contrib.* 14; *Prodr.* v. 435; villous silky hairy or woolly, sometimes glandular, stem erect subsimple very leafy, leaves petioled obovate irregularly toothed or serrate, heads $\frac{1}{4}$ in. collected into terminal spiciform dense (rarely open) cymes or panicles, invol. bracts narrow acuminate, receptacle glabrous, corolla purple, lobes of ☿ glandular, achenes terete or 4–5-angled not ribbed sparsely hairy. *Clarke Comp. Ind.* 74; *Kurz in Journ. As. Soc.* 1877, ii. 186 (*excl. syn.* hymenophylla). B. trichophora, parvifolia *and* phyllostachya, *DC. Prodr.* 436, 437, 438. Conyza lactucæfolia, paniculata, bifoliata *and* Wightiana, *Wall. Cat.* 3088, *in part*, 3090 A., 3091, 3093. Erigeron molle, *Don Prodr.* 172.

Throughout the plains of INDIA from the outer Himalaya and the Punjab eastwards and southwards; and in CEYLON, BIRMA and the MALAYAN PENINSULA.—DISTRIB. Malay Islds., China, Australia, Tropical Africa.

Similar to *B. lacera*, but easily distinguished by the small heads, purplish flowers, and hairy achenes. A very glabrous variety with large membranous long-petioled leaves, 4 by $1\frac{1}{2}$ in. from Rangoon may be the "*B. hymenophylla, DC.*," quoted by Kurz as a synonym of *Wightiana*, but which is not DC.'s plant of that name.

4. **B. neilgherrensis,** *Hook. f.*; densely softly villous and silky, stem simple stout erect or ascending, leaves 3–4 in. obovate or oblong-obovate sessile or narrowed into a petiole regularly sharply gland-toothed, heads $\frac{1}{3}$ in. diam. very numerous in axillary clusters forming an oblong or rounded terminal spike or panicle, invol. bracts almost filiform softly silky, recept. glabrous, corolla purple, lobes of ☿ glabrous, achenes glabrous angled, pappus $\frac{1}{8}$ in. white.

NILGHERRY and PULNEY HILLS, *Wight*, *Gardner*.

This is a mountain plant, near *Wightiana* in its purple flowers, but has a denser inflorescence, larger head, glabrous achenes, and very regularly toothed leaves. As in all Blumeas, the villosity or hairiness is a very inconstant character; this plant is sometimes as silky as *B. Belangeriana*.

5. **B. subcapitata,** *DC. Prodr.* v. 439; pubescent, sparsely villous upwards, stem slender simple, leaves denticulate radical long-petioled membranous obovate or elongate-obovate entire or serrately or subpinnatifidly lobed

below the middle, cauline smaller petioled, heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. solitary or 2–3-nate in the distant upper leaf-axils and forming a crowded oblong short terminal or cylindric contracted panicle, invol. bracts very slender glabrescent, receptacle glabrous, corolla yellow, lobes of ☿ glabrous, achenes nearly glabrous angled, pappus $\frac{1}{6}$ in. white. Conyza subcapitata, *Wall. Cat.* 3056.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 1-5000 ft., *J. D .H.*

I retain this species contrary to Mr. Clarke's opinion (who referred it to *B. lacera*) with diffidence, my Sikkim specimens precisely accord with Wallich's Nipal ones, and I find none of the forms of *lacera* at all like it.

6. **B. barbata,** *DC. in Wight Contrib.* 14; *Prodr.* v. 434: stem erect subsimple with very long hairs, leaves obovate or oblanceolate coarsely toothed or serrate silky beneath, heads $\frac{1}{4}$ in. peduncled in short loose axillary and terminal cymes forming an elongate inflorescence, invol. bracts narrowly linear acuminate hairy, recept. glabrous, corolla yellow, lobes of ☿ glandular, achenes most minute 5–6-ribbed striate hairy above, pappus white. *Kurz in Journ. As. Soc.* 1877, ii. 188, *excl. var.* β; *Clarke Comp. Ind.* 73. Conyza barbata, *Wall. Cat.* 3099.

TRAVANCORE; Pulney Mts., *Wight.* CEYLON, Central Province, alt. 3–5000 ft., *Thwaites.*

Stem 4–10 in., stout or slender. *Leaves* 1–2$\frac{1}{2}$ in. often narrowed into a petiole, membranous, hairy and subglandular above. *Heads* on slender peduncles.

7. **B. sericans,** *Hook. f.*; tall, robust, stem simple erect, and leaves beneath densely silvery villous, leaves 2–3 in. lower petioled upper elongate-oblanceolate or linear acuminate minutely toothed, heads $\frac{1}{3}$ in. sessile in crowded axillary and terminal clusters, recept. glabrous, corolla yellow lobes of ☿ hairy, achenes silky, pappus white. B. barbata, var. β sericans, *Kurz in Journ. As. Soc.* 1877, ii. 188.

CHITTAGONG; on hills, alt. 500–1500 ft., *Clarke.* BIRMA and MARTABAN, *Falconer, Kurz.*

This is quite unlike any other species in its long leaves, silvery silky pubescence and inflorescence.

8. **B. glomerata,** *DC. in Wight Contrib.* 15; *Prodr. l. c.* 443; pubescent or villous, stem erect usually slender, lower leaves petioled obovate serrate or lyrate-pinnatifid upper oblong incised, heads purple $\frac{1}{4}$ in. diam. in small sessile axillary clusters all along the branches, invol. bracts subulate-lanceolate villous, corolla yellow, lobes of ☿ and recept. pubescent, achenes 8–10-ribbed glabrous or hairy. *Dalz. & Gibs. Bomb. Fl.* 125. B. fasciculata, *DC. Prodr.* v. 442; *Clarke Comp. Ind.* 81. B. fistulosa, *Kurz in Journ. As. Soc.* 1877, ii. 187. B. holosericea, racemosa, spinellosa, gracilis, purpurea *and* leptoclada, *DC. l. c.* 442, 443. B. holosericea *and* leptoclada, *Dalz. & Gibs. Bomb. Fl.* 125, 126. Conyza fistulosa, *Roxb. Fl. Ind.* iii. 429. C. racemosa, sericea, glomerata, gracilis, purpurea *and* holosericea, *Wall. Cat.* 3002, 3021, 3055, 3064, 3076, 3103.

TROPICAL HIMALAYA; from Kumaon to Sikkim ascending to 5000 ft., and throughout the plains to ASSAM, BIRMA, TENASSERIM and the DECCAN (not in Ceylon).—DISTRIB. China, Java, Philippine Islds.

Very distinct in its normal state from the slender erect branches with rounded axillary clusters of purple sessile heads, which become spiciform. *Conyza sericea*, Wall., has leaves very silky, especially beneath, and *C. holosericea* resembles it, but differs from the typical inflorescence of the species in the clusters of flowers being borne on axillary peduncles. See also *B. membranacea*, var. *gracilis.*

9. **B. nodiflora,** *Hook. f.*; stem branched from the base, branches 2–4 in. long very slender dichotomously forked, leaves $\frac{1}{2}$–1 in. subsessile obovate

more or less toothed glabrous, heads ¼ in. in dense axillary globose clusters round the branches at the leaf axils and terminal, invol. bracts linear acute white woolly, recept. and unripe achenes puberulous.

PEGU; Prome, *M'Clelland.* TENASSERIM and MERGUI, *Griffith, Helfer.*

The clusters of heads resemble those of *Altenanthera nodiflora.*

10. **B. lacera,** *DC. Prodr.* v. 436; hairy villous or glandular, rarely glabrescent, stem erect simple or branched very leafy, leaves petioled obovate toothed or serrate rarely lobulate, heads ⅓ in. in short axillary cymes and collected into terminal spiciform panicles rarely corymbose, invol. bracts narrow acuminate hairy, recept. glabrous, corolla yellow, lobes of ☿ nearly glabrous, achenes sub- 4-gonous not ribbed glabrate. *Clarke Comp. Ind.* 76. B. Musra, *DC. l. c.* 435; *Deless. Ic. Sel.* iv. t. 23. B. leptoclada, *Dalz. & Gibs. Bomb. Fl.* 125, *not of DC.* B. villosa, *Schultz-Bip. in Pl. Hohenack.* n. 2a. Conyza lacera, *Roxb. Fl. Ind.* iii, 428; *Wall. Cat.* 3082. C. thyrsiflora, villosa *and* Musra, *Ham.*; *Wall. Cat. sub* 3082, 3083, 3095. C. lactucæfolia, *DC. l. c.* 435; *Wall. Cat.* 3088 *in part*; *Burm. Fl. Ind.* 180, t. 59, f. 1.

Throughout the plains of INDIA, from the N.W. ascending to 2000 ft. in the Himalaya, to Travancore and Singapore, and in CEYLON.—DISTRIB. Malay Islds., China, Tropical Africa.

It is very difficult to separate this in the Herbarium from *B. Wightiana* (which see), it is even more variable; when living, the yellow flowers at once distinguish it. The smell and glabrous receptacle should distinguish it from *laciniata.* but the latter character is very difficult to see in the last-named plant. Smells strongly of turpentine (Roxburgh).

VAR. *glandulosa*; whole plant more or less glandular. B. glandulosa. *DC. in Wight Contrib.* 14; *Prodr.* 438. B. Heyneana, *DC. l. c.* 15 and 441. B. trigona, *DC. l. c.* 437. Conyza Heyneana, *Wall. Cat.* 3089. ? B. napifolia, *DC. l. c.* 440. Conyza napifolia, *Wall. Cat.* 3075 (heads small). This passes into *C. membranacea,* var. *major.*

VAR. *cinerascens*; hoary or clothed with soft white pubescence, leaves obovate often simple petioled and toothed as in *B. lacera,* corymbs often effuse, receptacle puberulous. B. cinerascens, *DC. Prodr.* v. 438. B. runcinata, *Wall. Cat.* 3087 B.—Hot valleys of the Himalaya from Nipal to Bhotan.

11. **B. hieracifolia,** *DC. in Wight Contrib.* 15; *Prodr.* v. 442; tomentose villous or copiously woolly or silky, stem usually robust and simple sometimes scape-like, lower leaves elliptic or oblong petioled serrate or toothed upper sessile often entire, heads ½–¾ in. diam. more or less fascicled or spiked forming elongate panicles rarely corymbose, invol. bracts lanceolate acuminate, receptacle glabrous, corolla yellow lobes of ☿ glabrate, achenes hairy. *Wight. Ic.* t. 1099; *Clarke Comp. Ind.* 82; *Kurz in Journ. As. Soc.* 1877, ii. 188. Erigeron hieracifolia, *Don Prodr.* 172. Conyza hieracifolia, *Spreng. Syst.* iii. 524.

Throughout the hilly parts of INDIA, from the outer Himalaya in Kumaon eastwards and southwards to the NILGHERRY MTS. and MARTABAN.—DISTRIB. Java.

The robust habit of the larger form, and scapigerous habit of the smaller, are amongst the best characters of this most variable plant. A form (Conyza natans, *Herb. Ham.*) floats on tanks in Bengal.—See also 23. *B. crinita* and 25. *flexuosa.*

VAR. 1. *typica*; simple or sparingly branched, often scapigerous, leaves oblong crenulate or with small teeth silkily villous beneath, heads in a dense terminal cluster or spike.

VAR. 2. *macrostachya*; tall, robust, paniculately branched above, leaves with spreading hairs beneath, heads in large clusters at the ends of the branches. *Var. evolutior, Clarke l. c.* B. macrostachya *and* B. cernua, *DC. l. c.* 442 and 436. Conyza macrostachya *and* nutans, *Wall. Cat.* 3053, 3080.

VAR. 3. *Hamiltoni*; small, often clothed with close buff or white cottony tomentum,

branches solitary or several from the base, leaves chiefly radical often almost entirely villously silky beneath, heads in spiked fascicles. B. Hamiltoni, *DC. l. c.* 439. Gnaphalium Hamiltoni, *Wall. Cat.* 2938. Habit often that of *Antennaria hyperborea.* —See *B. crinita*, Arn., and *Belangeriana*, DC., which may be southern forms of this.

12. **B. angustifolia,** *Thwaites Enum.* 165; glabrous or puberulous, stem erect slender subsimple, leaves 1–3 in. all linear-oblong or lanceolate subobtuse narrowed at the base quite entire or obscurely toothed, heads few all peduncled crowded or corymbose, peduncles tomentose or glabrous, invol. bracts linear-lanceolate pubescent or sparingly villous, recept. glabrous, achenes nearly glabrous. *Clarke Comp. Ind.* 81.

CEYLON; central province, alt. 1–3000 ft., *Moon, Thwaites.*

Stem 1 ft., procumbent, branched and rooting below. I have seen but few specimens.

SECT. III. *Heads* many, small, $\frac{1}{4}$–$\frac{1}{2}$ in. diam., peduncled in open corymbs or panicles with often divaricate branches, rarely clustered.—Tall, erect, green herbs; stem simple below, paniculately or corymbosely branched above, glabrous or glandular, rarely villous densely woolly or silky; leaves, the lower especially, gashed or lacinate; pappus white.

13. **B. laciniata,** *DC. Prodr.* v. 436; erect, usually stout, pubescent or laxly tomentose, stem branched, leaves usually large membranous runcinate lyrate or subpinnatifid and toothed, heads $\frac{1}{3}$ in. diam. usually in broad open corymbs, invol. bracts lanceolate acuminate villous, recept. pubescent, corolla yellow, lobes of ☿ hairy, achenes ribbed silky. *Clarke Comp. Ind.* 78; *Kurz in Journ. As. Soc.* 1877, ii. 187. B. runcinata *and* sonchifolia, *DC. l. c.* 438. Conyza sonchifolia *and* runcinata, *Wall. Cat.* 3085, 3087 A. C. laciniata, *Roxb. Fl. Ind.* iii. 427; *Wall. Cat.* 3100, 3084 B.

TROPICAL HIMALAYA; from Kumaon eastwards, ascending to 4000 ft, in Sikkim. ASSAM, CACHAR and the KHASIA MTS., BEHAR and BENGAL; rare in the CONCAN, SOUTHERN INDIA and the MALAY PENINSULA.—DISTRIB. Malay Islds., China, Philippines.

Usually a taller plant than *B. lacera*, from which it is difficult to distinguish specimens with leaves more entire than usual, but it is usually more glabrous, and should have a pubescent receptacle; this latter character is, however, very variable, evanescent in age, and at all times requires a high power to detect. Roxburgh says that this differs from *B. lacera* in having all the leaves laciniate, to which I suppose may be added its being scentless. The four following species are possibly all reducible to *laciniata*.

14. **B. virens,** *DC. in Wight Contrib.* 14; *Prodr.* v. 439; quite glabrous, tall, slender, much branched, bright green, leaves membranous irregularly or sinuate-toothed lower petioled obovate lyrate or runcinate upper oblong small very numerous, heads $\frac{1}{4}$ in. glabrous on capillary peduncles all in large open much branched panicles with small leaves on the ascending branches, invol. bracts slender ciliolate, recept. very narrow glabrous, corolla yellow, lobes of ☿ glandular, achenes 8–10-ribbed with spreading hairs. *Clarke Comp. Ind.* 79 *in part.* B. lapsanoides, *DC. l. c.* 440. Conyza virens, *Wall. Cat.* 3037 A. B. C.

UPPER ASSAM, *Griffith*; BIRMA, *Wallich*; the CONCAN, CANARA, and NILGHERRY MTS., *Wight*, &c.

The perfectly glabrous habit distinguishes this from all other species; it sometimes grows 4 ft. high with a stem as thick as the finger, but is generally smaller. The stem is grooved and green with a few more or less conspicuous yellow slender ribs.

VAR. *minor*; 6–12 in., stem simple slender, leaves long-petioled elliptic ovate or lanceolate toothed or serrulate very membranous. Travancore at Courtallam, *Wight*. Closely resembles *B. membranacea*, but the glabrous panicle distinguishes it.

15. **B. membranacea,** *DC. Prodr.* v. 440; pubescent, tall, slender, much branched, leaves and heads and flowers as in *B. virens* but more or less softly pubescent, and the branches of the panicle glandular and with spreading hairs. B. hymenophylla, *DC. l. c.* 440. Conyza membranacea *and* hymenophylla, *Wall. Cat.* 3019, 3038. C. virens, *Wall. Cat.* 3037 D. C. diffusa, *Roxb. Fl. Ind.* iii. 429.

Common throughout INDIA.—DISTRIB. Malay Islds.

This may be a pubescent and glandular form of *B. virens.* The prevalent forms may be approximately limited as follows.

VAR. 1. *typica* ; tall, pubescent, much branched, leaves large membranous, heads many panicled.

VAR. 2. *muralis* ; glandular-hairy, stem usually simple slender, leaves elliptic-ovate or lanceolate toothed or serrulate very membranous, invol. bracts rigid coloured like those of a *Vernonia.* B. muralis, *DC. Prodr.* v. 440 ; *Dalz. & Gibs. Bomb. Fl.* 125. Conyza muralis, *Ham. in Wall. Cat.* 3077.—Though in extreme forms the heads of this look so different from those of *membranacea,* they are connected by numerous intermediates.

VAR. 3. *gracilis* ; heads subsolitary or racemose on the long slender branches. B. gracilis, *DC. Prodr.* v. 443. Conyza gracilis, *Herb. Heyne in Wall. Cat.* 3064. Taong-Dong in Ava, *Wallich.* Madras, *Herb. G. Thomson.*—This approaches *B. glomerata* in habit, and may be referable to it, but the receptacle is glabrous.

VAR. 4. *Gardneri* ; glabrous or puberulous, erect, bright green, corymbosely or paniculately branched and glandular, lower leaves 2–4 in. lyrate or runcinate-toothed, upper lanceolate sinuate-toothed, heads ½ in. diam. on slender peduncles, invol. bracts puberulous. B. hymenophylla, *Herb. Wt.* (*Kew Distrib.* 1577). B. glandulosa, *Thwaites Enum.*—Nilgherry Mts., *Wight, Gardner* ; Ceylon, *Walker,* &c.

VAR. 5. *viscosula,* covered with lax spreading long simple and glandular hairs, heads few at the ends of the few long branches of the panicle. B. viscosula, *DC. Prodr.* v. 441. B. lactucæfolia, var. nudipes, *Kurz in Journ. As. Soc.* 1877, ii. 187. —Prome, *Wallich* ; Pegu, *Gomez, Kurz* ; Rangoon, *Maclelland.*

VAR. 6. *subsimplex* ; anther-cells without tails, their bases connate with the filaments. B. paucifolia *and* subsimplex, *DC. Prodr.* v. 441. Conyza subsimplex, *Wall. Cat.* 3003. C. spiridens, *Miq. Fl. Ind. Bat.* ii. 44, *excl. syn.*—This is technically a *Laggera,* but I agree with Kurz in regarding it as a sexual form of *membranacea,* from which it differs solely by the anthers ; it represents closely both the larger and smaller forms of *membranacea,* and is widely distributed.

16. **B. Kingii,** *Clarke mss.* ; pubescent and glandular above, stem strict erect simple glabrate below, leaves 3–5 in. lower petioled runcinate or lyrate and unequally toothed rather membranous, heads ¼ in. all peduncled in open panicles with many divaricate bracteate branches, invol. bracts linear rigid green puberulous, recept. glabrous deeply pitted, achenes 10-ribbed puberulous.

MARWAR ; Mt. Aboo, *King.*

This again is closely allied to *B. virens,* and has similar habit and foliage, but the panicle is more robust and branched, and the invol. bracts are rigid like those of a *Vernonia.*

17. **B. Jacquemontii,** *Hook. f.* ; villous with spreading soft hairs, stem stout erect simple below, leaves 3–5 in. lower petioled obovate-lanceolate coarsely irregularly serrate upper sessile toothed or lacerate, heads ½ in. all peduncled in open panicles with divaricating branches and pedicels, invol. bracts numerous subulate-lanceolate rigid coloured puberulous, recept. pubescent, achenes 8–10-ribbed finely silky. B. obovata? *Clarke Comp. Ind.* 72 (*not of DC.*)

BEHAR, on Parusnath, alt. 4000 ft., *J. D. H.,* &c, CENTRAL INDIA, *Jacquemont* (n. 1054). NILGHERRY MTS., *Clarke* (*Comp. Ind.* 77) ; Hort. Bot. Calc., *Herb. Griffith.*

A large coarse species, with the paniculate inflorescence sometimes 18 in. across, yellow flowers and coloured invol. scales like those of a *Vernonia.*

SECT. IV. *Heads* few, rarely many, small, ¼–⅓ in., usually peduncled and forming loose axillary and terminal corymbs but often clustered.—Prostrate or decumbent rarely ascending or erect herbs, woolly villous or silky, branches usually dichotomously forked; leaves acutely irregularly toothed, the teeth often subspinescent; pappus white.

18. **B. oxyodonta,** *DC. in Wight Contrib.* 15; *Prodr.* v. 444; prostrate, pubescent villous or tomentose, branches spreading from the root leafy slender dichotomously forked or simple, leaves spinulose-toothed lower ½–3 in. petioled obovate membranous, upper obovate or oblong sessile, heads ¼ in. diam. on slender peduncles solitary or few corymbose, invol. woolly or glabrate, recept. glabrous, corolla yellow lobes of ☿ glabrous, achenes sparingly silky. *Clarke Comp. Ind.* 85. Conyza tenera, *Wall. Cat.* 3023.

WESTERN TROPICAL HIMALAYA, from Kumaon to Nipal, and southwards to CANARA, BEHAR, BENGAL, PEGU and BIRMA.—DISTRIB. China, Philippine Islds.

Smaller than most species and easily recognised by its decumbent habit. Clarke observes that in all the specimens he has examined those anther-cells which are tailless are empty of pollen, and Kurz suspects it is a hybrid, or a polygamous form of some other species.

19. **B. eriantha,** *DC. in Wight Contrib.* 15; *Prodr.* v. 444; pubescent or tomentose or clothed with scattered long hairs, rarely silkily villous, stems 1 ft. slender dichotomously branched from the base, leaves 1–3 in. acutely irregularly toothed lower petioled obovate obtuse, upper sessile obovate or oblong acute, heads small ¼–⅓ in. mostly on the long slender peduncles of dichotomous cymes rarely fascicled, peduncles and invol. clothed with long silky hairs, recept. glabrous, achenes very minute, angles obtuse sparingly silky.

The CONCAN, *Law.* BANDA, *Edgeworth.*

Usually very slender, with divaricate dichotomous branches, and heads with long slender peduncles; but some specimens are nearly as robust as *B. Malcolmii*, and almost as silvery-villous; the heads are, however, not half the size, and the achenes are smaller, and it is perhaps a var. of *oxyodonta.*

20. **B. Malcolmii,** *Hook. f.*; densely clothed with soft white silky wool, stems leafy ascending stout forked rarely decumbent from the root, leaves 1–4 in. sessile leathery obovate very obtuse acutely closely jaggedly toothed, heads ½–¾ in. diam. fascicled towards the ends of the branches or remote and peduncled villous with long white silky hairs, recept. glabrous, achenes obscurely angled silky. Pluchea lanuginosa, *Clarke Comp. Ind.* 95.

The CONCAN; hills above 2000 ft., *Law*; Belgaum and Velloor on the Fort walls (heads smaller), *Ritchie.*

The stout habit, dense silvery woolly clothing, and sparse often peduncled heads of this species are its most prominent characters. The buds at the crown of the root form globose woolly bodies, often clustered together; the jagging of the leaf-margin is very close and irregular. I have not seen specimens of the *Pluchea lanuginosa*, described by Clarke, who tells me that this is the same plant.

21. **B. Belangeriana,** *DC. Prodr.* v. 444; silkily woolly especially the leaves beneath, branches dichotomously forked strict leafy, lower leaves 2–3 in. petioled obovate finely toothed, upper sessile oblong coarsely toothed, heads ⅓ in. diam. sessile axillary solitary or clustered, invol. bracts woolly, recept. glabrous, corolla lobes of ☿ hispid, achenes (unripe) glabrous. B. Metziana, *Schultz-Bip. Pl. Hohenack.* n. 777.

The CONCAN, CANARA and MALABAR, *Law, Ritchie,* &c.

Usually much branched, the branches a foot long, stiff, and often red-brown.

SECT. V. *Heads* large, ½–¾ in. diam., usually clustered and axillary, or dis-

posed in elongated spikes racemes or contracted panicles.—Herbs with long simple or sparingly branched grooved erect or flexuous stems; leaves 1–3 in., sessile or shortly petioled, glabrous beneath or silky or tomentose, sparingly toothed; pappus white.—Some forms of *B. hieracifolia* belong here, perhaps also *B. chinensis.*

22. **B. malabarica,** *Hook. f.*; pubescent, branches slender elongate flexuous, leaves subsessile membranous linear-oblong acute distantly serrate slightly hairy beneath, heads ½ in. diam. pubescent in small axillary sessile or peduncled clusters, recept. broad pubescent, achenes strongly ribbed nearly glabrous.

CANARA and MALABAR, *Ritchie*; Bababoodan Hills, *Law.*

This appears a very distinct species, the leaves are membranous, and have a distinct short slender petiole, quite unlike that formed by the narrowed bases of the leaves; it is possibly a scandent species.

23. **B. crinita,** *Arn. Pugill.* 30; *DC. Prodr.* vii. 283; pubescent hirsute or villous, stem elongate slender or stout flexuous, leaves scabrid rigid sessile obovate-oblong acute sharply finely or coarsely toothed scabrid above glabrate or tomentose beneath, heads ½–⅔ in. diam. woolly or villous sessile in small sessile or long peduncled clusters usually forming an elongate sparse panicle, receptacle and corolla lobes of ☿ glabrous, achenes ribbed glabrous, pappus white. *Clarke Comp. Ind.* 84.

CEYLON; central province, Adam's Peak and Neuera Ellia, *Walker*, &c.

The long brown often flexuous stems, and hard uniform toothed sessile leaves, usually rounded at the base, and the glabrous achenes distinguish this from *B. hieracifolia,* to which it is closely allied.

24. **B. Clarkei,** *Hook. f.*; stem simple elongate flexuous pubescent or tomentose, leaves shortly petioled 2–3 in. obovate or oblanceolate accuminate toothed pubescent or villous beneath, heads ½–⅔ in. diam. sessile and axillary or peduncled in axillary clusters forming very narrow elongate panicles, invol. bracts slender, receptacle broad pubescent, corolla yellow, lobes of ☿ glandular, achenes obscurely silky, pappus white. B. hieracifolia, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 1–3000 ft., *J. D. H.*, *Clarke.* CACHAR, *Keenan.* MERGUI, *Griffith.*

This has quite simple stems, and is intermediate in habit between the larger forms of *hieracifolia* and *malabarica.* It agrees in many points with De Candolle's *B. elongata* (Prodr. v. 445), founded on Wallich's *Conyza elongata*, Cat. 3078, of which there is no specimen in Wallich's Herbarium, but the receptacle of that plant is described as glabrous, and it is a native of Penang.

25. **B. flexuosa,** *Clarke Comp. Ind.* 86; tall, robust, stem much branched leafy clothed with soft spreading hairs, leaves 3–5 in. petioled elliptic-lanceolate acuminate and pungent clothed beneath with long soft silky or spreading hairs or glabrate acutely irregularly toothed, heads ¾ in. in large panicled clusters rarely separately peduncled and cymose, invol. bracts broad pubescent, receptacle nearly pitted, corolla yellow, lobes of ☿ hairy, pappus white. B. hieracifolia, var. *Thwaites Enum.* 163.

NILGHERRY MTS.; Sisparah, *Wight.* CEYLON; Neuera Ellia, *Gardner.*

I separate this from the larger forms of *B. hieracifolia* with great reluctance, especially as Thwaites united the Ceylon specimens with that plant. Both forms have heads sometimes all pedicelled, and forming a loose open cyme, as in the following section. The receptacle is indistinctly pubescent.

VAR. *zeylanica*; leaves from glabrate to densely silkily villous beneath, heads smaller.

VAR. *peninsularis*; leaves softly loosely hairy beneath.

SECT. VI. *Heads* very numerous, large or small, forming narrow or broad terminal branched corymbs or panicles.—Shrubs or small trees (except *B. chinensis* and *obovata*, sometimes climbing); leaves very large, 8–18 in. long; pappus white or red.

* *Pappus white.*

26. **B. chinensis,** *DC. Prodr.* v. 444; scandent, quite glabrous, leaves shortly petioled elliptic-lanceolate acuminate glandularly subserrate coriaceous, heads ½ in. clustered on the short distant branches of a long terminal pubescent panicle, invol. bracts puberulous outer short obtuse, recept. densely hirsute, ☿ corolla-lobes hairy, achenes strongly 10-ribbed hairy. B. riparia, *DC. l.c.*; *Clarke Comp. Ind.* 85. Conyza chinensis, *Linn.*; *Blume Bijd.* 898. C. riparia, *Blume, l.c.* 899. C. longispina, *Zoll. & Morr. Syst. Verg.* 121. C. serici-vestita, *Wall. Cat.* 2996 B. Baccharis nitida, *Wall. Cat.* 3043.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 2–4000 ft. ASSAM, and KHASIA MTS., *J. D. H. & T. T.* PENANG, *Wallich*, &c.—DISTRIB. Java, S. China.

Branches terete, grooved, flexuous. *Leaves* green; petiole slender, ½–¼ in. *Involucre* quite unlike any other species; the outer bracts very short, coriaceous and obtuse; inner long and thin. *Pappus* white.

27. **B. obovata,** *DC. Prodr.* v. 446; herbaceous, stem and panicle softly densely villous, leaves narrowed into a short petiole obovate-lanceolate acute or acuminate faintly or coarsely toothed membranous glabrous above tomentose beneath, heads very few ¾ in. diam. on simple or branched peduncles at the end of a very long almost naked branch, invol. bracts villous very many slender and shining, recept. with a very few hairs, ☿ corolla lobes glandular, achenes unripe. Conyza obovata, *Wall. Cat.* 3022.

NIPAL, *Wallich.*

Known only from Wallich's specimens. Its herbaceous character would bring it under the first division of the genus, but the large head habit and foliage are that of this; pappus quite white.

28. **B. sikkimensis,** *Hook. f.*; branches stout glabrous, leaves 8–12 in. elliptic-lanceolate narrowed into a petiole acuminate obtusely subserrate glabrous membranous, heads ⅓ in. on slender peduncles loosely clustered at the ends of the slender branches of a large pubescent panicle, invol. bracts puberulous very narrow revolute in age, recept. broad glabrous, ☿ corolla lobes pubescent, achenes ribbed silky, pappus dirty white.

SIKKIM HIMALAYA; alt. 5000 ft., *J. D. H.*

Probably climbing, branches grooved as in *B. chinensis.*

29. **B. procera,** *DC. Prodr.* v. 445; villous above or tomentose, branches long stout, leaves 5–8 in. sessile obovate-oblong or -lanceolate acuminate coarsely irregularly toothed glabrous or hirsute beneath base cordate, heads ½ in. in dense (rarely loose) compound clusters on the woolly branches of an elongate panicle, invol. bracts silky outer short acute coriaceous, recept. narrow glabrous, lobes of ☿ corolla very hairy, achenes ribbed shortly silky, pappus very white. *Clarke Comp. Ind.* 86. B. semivestita, *DC. l. c.* Conyza procera *and* semivestita, *Wall. Cat.* 3050, 2996 A. C. repanda, *Roxb. Fl. Ind.* iii. 431.

TROPICAL HIMALAYA; from Nipal eastwards, ascending in Sikkim and the KHASIA MTS. to 5000 ft. ASSAM, PEGU, TENASSERIM, MARTABAN, BIRMA.

The cordate narrowed base of the large leaves is a good character of this species, which grows to 6 ft. high. I have not quoted Kurz, who (*As. Soc. Journ.* 1877, ii. 189) considers *procera* to be a var. of *macrophylla.* Clarke believes that Kurz's *macrophylla* has red pappus, and that his *procera* is Blume's *confusa.*

** *Pappus red. Receptacle more or less villous or pubescent* (except in *B. spectabilis, var. longifolia*).

30. **B. Hookeri,** *Clarke mss.*; erect, puberulous, leaves 8–18 in. membranous oblong-lanceolate pinnatifid acuminate narrowed into a winged petiole lobes upcurved acuminate denticulate or lacerate, heads very many ¼ in. diam. peduncled in a very large branched pubescent panicle, invol. bracts narrow rigid puberulous, corolla lobes hispid, recept. narrow pubescent, achenes unripe.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.* KHASIA MTS., *Simons.*

Stem stout, green, herbaceous. *Leaves* sometimes 7 in. broad, very membranous and glabrous, quite unlike those of any other species.

31. **B. myriocephala,** *DC. Prodr.* v. 445; shrubby, branches very stout glabrous or puberulous, leaves 6–10 in. glabrous oblanceolate acuminate narrowed into an often appendaged petiole serrulate many-nerved coriaceous, heads ¼–⅓ in. subsessile or clustered on the ascending branches of a narrowly pyramidal elongate tomentose erect panicle, invol. bracts tomentose squarrosely recurved in age, recept. villous or glabrate, ☿ corolla-lobes glabrous or glandular, achenes 10-ribbed hairy. B. sessilifolia, *Kurz in Journ. As. Soc.* 1877, ii. 189. Conyza squarrosa, *Wall. Cat.* 3025. C. lanceolaria, *Roxb. Fl. Ind.* iii. 432.

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.* SILHET, *de Silva.* ASSAM and BIRMA, *Griffith.* CHITTAGONG, *Clarke.*

Stem as thick as the forefinger. The very numerous nerves and recurved (when dry) margins of the leaves and their small regular teeth, are unlike any other species of this shrubby section, except the following. The name *Conyza lanceolaria*, Roxb. is attached to a Calcutta Bot. Garden very narrow-leaved form of this plant in Griffith's Herbarium.

32. **B. spectabilis,** *DC. Prodr.* v. 445; shrubby, branches very stout glabrous below pubescent above, leaves 4–10 in. glabrous oblanceolate or elliptic acuminate subserrate narrowed into a long winged often appendaged petiole, heads ½ in. peduncled free or clustered along the branches of a broad bracteate pyramidal panicle, invol. bracts slender pubescent, ☿ corolla-lobes glandular, achenes (unripe) silky, pappus red. B. myriocephala, *Thwaites Enum.* 163, *excl. syn.* Conyza longifolia, *Herb. Heyne in Wall. Cat.* 3026.

MYSORE, *Heyne.* TRAVANCORE, *Wight*, &c. CEYLON, central province, alt. 4000 ft.

VAR. *longifolia*; heads smaller ¼ in. diam. sessile on the branches of a narrow panicle. B. longifolia, *DC. Prodr.* v. 446; *Dalz. & Gibs. Bomb. Fl.* 125. Tullawaree and Purdana, in Canara, *Stocks, Ritchie.*—Perhaps a different species, the heads not half the size of the type, densely crowded on the branches of a much more contracted panicle, and the receptacle is quite glabrous, but the leaves are identical and very characteristic.

33. **B. densiflora,** *DC. Prodr.* v. 446; stem stout, panicle and leaves beneath densely tomentose or clothed with thick white felted wool, leaves 8–18 in. broadly elliptic or elliptic-lanceolate narrowed into a long winged sometimes appendaged petiole puberulous above serrate-toothed or pinnatifid, heads ¼ in. diam. sessile in rounded clusters on a large branched panicle, invol. bracts narrow rather rigid, recept. narrow glabrous, corolla-lobes of ☿ hairy, achenes 10-ribbed pubescent, pappus red. *Clarke Comp. Ind.* 88. B. excisa *and* grandis, *DC. l. c.* 446, 447. B. Milnei, *Seem. Fl. Viti* 141, t. 27. Conyza densiflora, excisa *and* grandis, *Wall. Cat.* 2997, 3011, 3051. C. falcigera, *Wall. Cat.* 2048; *ex DC. l. c.* C. dasycoma, *Miq. Fl. Ind. Bat.* ii. 56.

TROPICAL HIMALAYA; Sikkim. ASSAM; Mishmi and Naga hills, *Griffith.* KHASIA MTS., alt. 2–4000 ft. Tavoy, *Wallich.*—DISTRIB. Malay and Fiji Islands.

The very woolly white undersurface of the leaves is a striking character of this species, which however Kurz unites with *balsamifera*, perhaps, as Clarke thinks, rightly, but the corolla lobes in this are hairy, and very glandular in *balsamifera.*

34. **B. aromatica,** *DC. Prodr.* v. 88; glandular, stem stout and leaves beneath glabrous pubescent or loosely villous, leaves 6–12 in. membranous obovate-oblong or -lanceolate serrate toothed or lobulate and jagged membranous lower narrowed into a broadly winged often appendaged petiole upper sessile, heads ⅕–½ in. sessile or peduncled in clusters on the branches of a large spreading panicle, invol. bracts slender puberulous, recept. glabrous, corolla-lobes glandular, achenes 10-ribbed hairy, pappus red. *Clarke Comp. Ind.* 88. Conyza aromatica, *Wall. Cat.* 3054.

TROPICAL HIMALAYA; from Kumaon, alt. 1000 ft. eastwards, ascending to 5000 ft. in Sikkim. ASSAM and KHASIA MTS., alt. 3000 ft. TENASSERIM, *Kurz.*

A very aromatic shrubby herb, chiefly distinguished from *B. balsamifera* by the membranous foliage.

36. **B. balsamifera,** *DC. Prodr.* v. 466; tomentose or villous or silkily woolly, stem tall corymbosely branched above, leaves 4–8 in. coriaceous elliptic or oblong-lanceolate usually silky above serrate sometimes pinnatifid narrowed into a usually auricled short petiole, heads ¼–⅓ in. sessile or peduncled in rounded clusters on the stout branches of a large spreading or pyramidal panicle, invol. bracts tomentose, recept. glabrous, achenes 10-ribbed silky, pappus red. *Clarke Comp. Ind.* 89; *Kurz in Journ. As. Soc.* 1877, ii. 189, *excl. some syn.*; *For. Fl.* ii. 82; Conyza balsamifera, *Linn.*; *Wall. Cat.* 2998; *Roxb. Fl. Ind.* iii. 427; C. vestita, *Wall. Cat.* 2998. C. appendiculata, *Blume Bijd.* 895, *not Lamk.*

TROPICAL HIMALAYA; Nipal and Sikkim, alt. 1–4000 ft. ASSAM, KHASIA MTS., CHITTAGONG, PEGU, BIRMA and the EASTERN PENINSULA, to Singapore and Penang.—DISTRIB. Java.

The most arboreous of all the species, smelling strongly of camphor.

DOUBTFUL SPECIES.

B. ELONGATA, *DC. Prodr.* v. 445 (Conyza elongata, *Wall. Cat.* 3078); see under *B. Clarkei.*

B.? LEUCANTHEMA, *DC. Prodr.* v. 436 (Erigeron leucanthum, *Don Prodr.* 171). It is impossible to identify this by the meagre description of Don.

B. PUBIFLORA, *DC. Prodr.* v. 434; from Madras (Erigeron asteroides, *Roxb. in Wall. Cat.* 2975), is probably the Roxburghian plant referred to (see p. 254), but there are no specimens of Wallich's plant in his herbarium.

27. LAGGERA, *Sch. Bip.*

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent. *Heads* panicled or axillary, yellow (always?), heterogamous, disciform; outer fl. ♀, ∞-seriate, fertile, filiform, mouth minutely toothed; disk-fl. ☿, ∞-seriate, fertile, tubular, limb 5-fid. *Involucre* campanulate; bracts ∞-seriate, narrow, often rigid, outer shorter; receptacle flat, naked. *Anther-bases* 2-lobed or sagittate; auricles obtuse or acute, often unequal, not tailed nor connate with the adjoining anthers. *Style-arms* of ☿ and pappus as in *Blumea.*—DISTRIB. Species 10, tropical African and Indian.

See remarks under *Blumea* and under *B. membranacea, var.* 6.

1. **L. flava,** *Benth. in Gen. Pl.* ii. 290; quite glabrous or puberulous, very slender, leaves sharply toothed or incised lower petioled cauline oblong-cordate ½-amplexicaul, heads ¼ in. diam. few cymose, fl. golden yellow. *Clarke Comp. Ind.* 90. Blumea flava, *DC. Prodr.* v. 439. Erigeron falcatum, *Don Prodr.* 172; *Kurz in Journ. As. Soc.* 1877, ii. 191; *excl. syn.* Conyza fasciculata, *Wall. Cat.* 3019 (*not* 3094).

Throughout NORTHERN INDIA; from the HIMALAYA in Kumaon eastwards, ascending to 6000 ft. in SIKKIM and BHOTAN; southwards to BEHAR and the GOLCONDAH HILLS, *Beddome* in the west, and to CHITTAGONG, PEGU, TAVOY and PENANG in the east.

Stem 6 in. to 3 ft., simple or corymbosely branched above, grooved. *Leaves* 1–3 in., sometimes scaberulous, membranous. *Heads* on capillary peduncles; recept. glabrous; corolla yellow, lobes of ☿ glabrous; anthers sagittate. *Achenes* most minute, glabrous. *Pappus* white.

2. **L. alata,** *Schultz-Bip. in Herb. Hohenack.* n. 1340; robust, much branched, pubescent or tomentose, stem with entire wings, leaves oblong toothed sessile decurrent, heads ⅔ in. diam. racemed on short axillary winged branches drooping in fruit, fl. purplish. *Clarke Comp. Ind.* 91. L. divaricata, *Oliv. Fl. Trop. Afr.* iii. 525. Blumea alata, *DC. Prodr.* v. 448; *Dalz. & Gibs. Bomb. Fl.* 125; *Wight Ic.* t. 1101. B. vernonioidea, *DC. l. c.* 447. Conyza alata, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 430. C. nutans, *Blume Bijd.* 896. C. cernua, *Wall. Cat.* 3012. Erigeron alatum, *Don Prodr.* 171. Vernonia Wightiana, *Wall. Cat.* 2923 (*not of Arnott*).

TROPICAL HIMALAYA, alt. 1–5000 ft., from Simla eastwards to SIKKIM, and southwards in hilly districts ascending to 6000 ft. in the NILGHERRY MTS., and to 7000 ft. in CEYLON. Not found south of the Khasia Mts. and Birma in the east.—DISTRIB. Java, China, Philippine Islds., Trop. Africa.

A stout, leafy herb. *Leaves* 1–4 in., sometimes almost entire. *Invol. bracts* many, outer short herbaceous often recurved, inner long straight. *Achenes* hairy; pappus white.

3. **L. pterodonta,** *Benth. in Gen. Pl.* ii. 290; much branched, glabrous or puberulous, stem with deeply toothed lobed or interrupted wings, leaves sessile oblanceolate toothed or pinnatifid at the base, heads ⅔ in. diam. on (usually) slender peduncles at the ends of the branches, fl. purple. *Clarke Comp. Ind.* 92. Blumea pterodonta, *DC. in Wight Contrib.* 16; *Prodr.* v. 448; *Wight Ic.* t. 1100. Conyza cernua, *Wall. Cat.* 3012 B. Serratula polygona, *A. Rich. Fl. Abyss.* i. 437, t. 62.

TROPICAL HIMALAYA; from Simla, alt. 4000 ft. eastwards. ASSAM, BIRMA, NILGHERRY and PULNEY MTS.—DISTRIB. Trop. Africa.

A more slender and glabrous plant than *L. alata*, well distinguished by the remarkable wings of the stem, which are sometimes represented by a series of membranous vertical laminæ ⅙–½ in. broad. *Invol. bracts* glabrous, rigid.

4. **L. aurita,** *Schultz-Bip. in Herb. Hohenack.*; rather slender, viscidly hirsute pubescent or villous, stem not winged, leaves small sessile or petioled oblanceolate toothed lobed cut or ½-pinnatifid, heads ⅓–½ in. diam. in small lateral or terminal corymbs, flowers pink. *Clarke Comp. Ind.* 92. Blumea aurita, *DC. Prodr.* v. 449. B. guineensis, *DC. l. c.* Conyza aurita, *Linn. f.*; *Roxb. Fl. Ind.* iii. 428; *Wall. Cat.* 3069? *and* 3086; *Boiss. Fl. Orient.* iii. 216.

Plains of India from the PUNJAB and SCIND, eastwards and southwards to CHITTAGONG, BIRMA and TRAVANCORE.—DISTRIB. Tropical Africa.

A well-marked species. The leaves are decurrent, but very shortly only. *Invol. bracts* slender, soft, villous.—The whole plant has an odour of turpentine.

28. **PLUCHEA,** *Cass.*

Shrubs rarely herbs, tomentose or glutinous. *Leaves* alternate. *Heads* small, in terminal leafless corymbs or large and subsolitary, heterogamous, disciform, white, yellow or lilac; outer fl. ♀, ∞-seriate, fertile, filiform; disk-fl. ☿, few, sterile, tubular, limb 5-fid. *Involucre* ovoid or campanulate; bracts

ovate, usually broad, dry, rigid; receptacle flat, naked. *Anther-bases* sagittate, cells tailed. *Style-arms* of ☿ filiform, entire or 2-fid. *Achenes* small, 4–5-angled; pappus hairs slender, 1-seriate, rigid, free or many and connate in the sterile achenes.—DISTRIB. About 30 species, tropical and subtropical.

1. **P. indica,** *Less.*; *DC. Prodr.* v. 451; shrubby, glabrous or nearly so, leaves obovate or oblanceolate subserrate narrowed into the short petiole, heads in compound terminal corymbs, outer invol. bracts broad tips rounded. *Wight Ill.* t. 131 (*colour of fl. wrong*); *Clarke Comp. Ind.* 93. P. foliolosa, *DC. Prodr.* v. 451. Conyza corymbosa, *Roxb. Fl. Ind.* iii. 426; *Wall. Cat.* 3009. C. indica, *Miq. Fl. Ind. Bat.* ii. 58. Baccharis indica, *Linn.*

Salt marshes, &c., from the SUNDERBUNDS to MALACCA and PENANG.—DISTRIB. Malay Islds., China.

A low shrub. *Leaves* 1–2 in., obtuse acute or apiculate, often gland-dotted. *Corymbs* pubescent; heads ¼ in. diam.: flowers of disk ☿ 3; of ray ♀, numerous. *Achenes* minute, ribbed, nearly glabrous; pappus scanty, white, spreading.

2. **P. ovalis,** *DC. Prodr.* v. 450; shrubby, pubescent, branches winged, leaves sessile oblong or obovate-oblong coarsely toothed, heads in compound terminal corymbs, outer invol. bracts acute. *Oliv. Fl. Trop. Afr.* iii. 328. Baccharis ovalis, *Pers. Synops.* ii. 424.

PUNJAB; in the Salt Range, *Aitchison.*—DISTRIB. N. Africa.

A large shrub. *Branches* with broad green toothed and sinuate wings like *Laggera pterodonta*. *Leaves* 2–2½ by ¾–1 in., tips rounded. *Corymbs* scaberulous; heads ¼ in. diam. *Achenes* (young) glabrous. The wing may be an inconstant character. The specimens are poor, and it may prove a form of *P. tomentosa.*

3. **P. tomentosa,** *DC. in Wight Contrib.* 16; *Prodr.* v. 457; shrubby or tomentose, pubescent, branches not winged, leaves sessile broadly obovate base auricled coarsely toothed, heads in compound terminal corymbs, outer invol. bracts acute. *Clarke Comp. Ind.* 94. Conyza tomentosa, *Wall. Cat.* 3031.

UPPER BENGAL, on the Ganges from Futtihpore to Cawnpore. CENTRAL INDIA, SCIND and the DECCAN to TRAVANCORE.

A more or less glandular shrub, 5 ft. high (*Dalzell*). *Leaves* 1½–2 in., often as broad, acute or obtuse. *Corymbs* and heads as in *P. ovalis*. *Pappus* reddish.

4. **P. Wallichiana,** *DC. Prodr.* v. 451; shrubby, glandular-pubescent and scabrid, branches not winged, leaves sessile obovate-oblong faintly toothed, heads in compound corymbs, outer invol. bracts tomentose subacute. *Dalz. & Gibs. Bomb. Fl.* 126; *Clarke Comp. Ind.* 94. Conyza sessilifolia, *Wall. Cat.* 3029. C. Candolleana, *Boiss. Fl. Orient.* iii. 217.

The PUNJAB, *Falconer*, *Stewart*. SCIND, *Stocks*. GUZERAT ("only one specimen seen in the whole country, perhaps not indigenous," *Dalzell*). DISTRIB. Beluchistan.

A tall shrub. *Leaves* 1–2 in., variable in breadth, rigid, nerves raised on both surfaces. *Heads* very similar to those of *tomentosa*.—Wallich gives Srinuggur in Kamrup, as the habitat, but I suspect the specimen is one of Hamilton's and probably western.

5. **P. lanceolata,** *Oliv. Fl. Trop. Afr.* iii. 329; shrubby, hoary-pubescent, leaves sessile very coriaceous oblong or oblanceolate pungent quite entire strongly nerved, heads in compound corymbs, invol. bracts short rounded obtuse. Berthelotia lanceolata, *DC. Prodr.* v. 376; *Deless. Ic. Sel.* iv. t. 21; *Boiss. Fl. Orient.* iii. 218. Conyza lanceolata, *Wall. Cat.* 2991.

UPPER BENGAL, at Cawnpore, OUDH, and westward to the PUNJAB and SCIND.—DISTRIB. Affghanistan, Beluchistan, N. Africa.

Branches rather slender. *Leaves* 1–2 in., pale when dry, with strong very oblique

nerves on both surfaces. *Heads* longer than broad; invol. contracted at the mouth, outer bracts hoary.

6. **P. arguta,** *Boiss. Diagn. Ser.* ii. 3, p. 5; shrubby, glandular-pubescent, leaves sessile oblanceolate or obovate pungent coarsely serrate or lobulate base auricled or not, heads peduncled solitary or few not or hardly corymbose, invol. bracts subulate-lanceolate rigid. P. frutescens, *Benth. in Hook. Ic. Pl.* xii. t. 1157. Conyza odontophylla, *Boiss. Fl. Orient.* iii. 217. Laggera arida, *Clarke Comp. Ind.* 92.

SCIND, *Stocks*; Boogta hills, *Vicary.* PUNJAB, *Aitchison.*—DISTRIB. Beluchistan.

A stout branched shrub, succulent when near the sea. *Leaves* 1–1½ in., very variable in breadth, from ⅙–⅔ in. *Heads* ⅓–½ in. diam., quite different from those of the preceding species, both as to structure and arrangement.

7. **P. linearifolia,** *Clarke Comp. Ind.* 95; annual, scaberulous, leaves sessile very long linear rigid coriaceous margins recurved toothed, heads clustered at the ends of the long branches of the corymb, outer invol. bracts rounded.

ASSAM, *Masters.* MISHMI at Jingsha, on the Karam in sandy places, banks of the Lohit below the Dihong (and ? KHASIA MTS.), *Griffith.*

Stem apparently 2–3 ft., simple below, slender or stout, sometimes as thick as the little finger, corymbosely branched above. *Leaves* 5–8 by ¼–⅓ in., sessile by a broad base, midrib very stout, nerves very obscure. *Corymb* very scabrid, branches naked, stiff, erecto-patent. *Heads* ¼ in. diam.; invol. bracts scaberulous. *Achenes* not seen; pappus snow-white.—This is a very curious plant, clearly annual, and differing wholly in habit from the preceding but agreeing in the heads and flowers. A ticket with "Khasia" on it is amongst Griffith's specimens, but no other collector has found it there, and the ticket is probably misplaced.

EXCLUDED SPECIES.

P. EUPATORIOIDES, *Kurz For. Fl.* ii. 575; *Journ. As. Soc.* 1877, ii. 191; has not been found hitherto within the British border, it is a viscid Siamese shrub, with petioled linear coarsely toothed leaves and corymbs of small heads with broad ovate-lanceolate invol. bracts.

29. NANOTHAMNUS, *Thoms.*

A small rigid woolly herb. *Leaves* alternate, acutely serrate. *Heads* small, subsessile, subterminal and axillary, heterogamous, disciform; outer fl. 1–4, ♀, (rarely 0), filiform, 2–3-toothed, fertile; disk-fl. ☿, few, fertile, tube slender, limb campanulate sub-2-lipped, outer lip 4-lobed, inner free to the base. *Involucre* ovoid; bracts ∞-seriate, lanceolate, dry, inner sub-scarious, outer shorter hispid; receptacle flat, naked. *Anther-bases* sagittate, auricles mucronate or shortly tailed. *Style-arms* of ☿ filiform. *Achenes* obovoid, tip rounded, ribs 5–8 slender; pappus 0 or a minutely 5-toothed crown.

N. sericeus, *Thoms. in Journ. Linn. Soc.* ix. 342, t. 3; *Clarke Comp. Ind.* 96.

The CONCAN, on dry hills, *Dalzell,* &c.

Root stout, fusiform, woody, annual? *Stems* very many from the root, decumbent or suberect and ascending, 6–8 in. long, pale, rigid. *Leaves* ½–2 in., lanceolate, sessile or contracted into a petiole, rigid, pungent and with irregular pungent teeth, strongly nerved and reticulate. *Heads* ¼ in., in dense clusters.—This curious plant bears some resemblance to a *Blumea* of the *oxyodonta* group in habit and foliage.

30. **EPALTES,** *Cass.*

Herbs. *Leaves* alternate, usually decurrent. *Heads* small, solitary or corymbose, heterogamous, disciform; outer fl. ∞-seriate, ♀, fertile, corolla much shorter than the style, filiform, 2–3-toothed; disk-fl. ☿, usually sterile, tubular, limb 3–5-fid. *Involucre* broad; bracts ∞-seriate, dry, rigid; receptacle flat or convex or raised, naked. *Anther-bases* sagittate, auricles minute, connate; tails small. *Style* of ☿ subulate, entire or 2-fid. *Achenes* of ♀ subterete, 5–10-ribbed, pappus 0; of ☿ usually abortive, pappus-hairs 2–3, caducous or 0.—DISTRIB. Species 9, Tropical Asiatic, African, and American.

1. **E. divaricata,** *Cass.*; *DC. in Wight Contrib.* 16; *Prodr.* v. 461; heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. subsolitary globose, invol. bracts finely acuminate inner longer than the flowers. *Dalz. & Gibs. Bomb. Fl.* 126; *Clarke Comp. Ind.* 96 (*excl. syn. E. pygmæa*); *Wall. Cat.* 2988. E. linearifolia, *DC. l. c.* Ethulia divaricata, *Linn.*; *Burm. Fl. Ind.* 170, t. 58, f. 1.

WESTERN PENINSULA; watery places from the Concan southwards. BIRMA, at Prome, *Wallich.* CEYLON, abundant.—DISTRIB. Java, China.

Glabrous, annual, 4–8 in. high, branched from the base; branches divaricate, winged. *Leaves* 1–2$\frac{1}{2}$ in., linear, linear-oblong or lanceolate, narrowed at the base, toothed or entire, decurrent. *Heads* on winged peduncles, when ripe dull purplish, with the invol. bracts almost pungent. *Achenes* $\frac{1}{30}$ in., pale, obovate-oblong.

2. **E. pygmæa,** *DC. Prodr.* v. 461; heads $\frac{1}{6}$ in. diam., invol. bracts broad obtuse or acute shorter than the flowers.

The CARNATIC, *Belanger, Wight.*

This occurs in Wight's Herbarium mixed with *E. divaricata*, from which it widely differs in the smaller size, the shape and size of the heads of the invol. bracts, and more still in the achenes, which are not half the size (about $\frac{1}{60}$ in.), more oblong, black and obscurely ribbed. There is a fragment of this in Wallich's Herbarium, collected by Rottler, and mixed with *E. divaricata.*

31. **SPHÆRANTHUS,** *Linn.*

Low annuals with spreading branches. *Leaves* alternate, toothed, decurrent. *Heads* small, in terminal solitary globose clusters, which are usually involucrate by a few empty bracts, sessile on a common receptacle and bracteate or not, heterogamous, disciform; outer fl. ♀, few or many, fertile, slender, minutely 2–3-toothed; disk-fl. ☿, solitary or few, fertile or sterile, tube thickened, limb 4–5-toothed. *Involucre* narrow; bracts narrow, acute, dry, unequal; receptacle small, naked. *Anther-bases* sagittate, auricles acute or tailed. *Style-arms* of ☿ filiform or connate. *Achenes* oblong, subcompressed; pappus 0.—DISTRIB. Species 8, Tropical Asiatic, African and Australian.

1. **S. amaranthoides,** *Burm.*; *DC. Prodr.* v. 370; erect, glabrous, branches not winged, leaves linear-oblong narrowed at the base decurrent obtuse serrulate, clusters of heads subsessile ovoid glabrous, bracts imbricating spinescent. *Clarke Comp. Ind.* 96. S. zeylanicus, *Heyne in Wall. Cat.* 3180 A.B. Oligolepis amaranthoides, *Wight in Calc. Journ. Nat. Hist.* vii. 161; *Ic.* t. 1149.

SOUTHERN MYSORE and TRAVANCORE; in rice fields, *Wight.* CEYLON, not uncommon.

Stem sometimes as thick as the little finger, but short, branches 8–12 in. *Leaves* 2–4 in. *Heads* $\frac{1}{2}$–1 in.

2. **S. peguensis,** *Kurz in Journ. As. Soc.* 1877, ii. 283; erect or decumbent, glandular-pubescent, branches winged, leaves strap-shaped or linear-oblong narrowed at the base and decurrent obtuse coarsely serrate, clusters of heads broadly ovoid hirsute, bracts imbricating spinescent. *Clarke Comp. Ind.* 97. S. zeylanicus, *Wall. Cat.* 3180 C.

BIRMA; banks of the Irawaddi, *Wallich.* PEGU, *Kurz.*

Less robust than *S. amaranthoides,* and with the decurrent bases of the leaves continued throughout the nodes, and toothed; clusters of heads shorter and hairy all over.

3. **S. africanus,** *Linn. Sp. Pl.* 1314; glabrous or pubescent, branches ascending winged, leaves obovate narrowed and decurrent at the bases finely toothed, clusters of heads small globose on winged peduncles glabrous, bracts rounded not imbricating. S. africanus *and* microcephalus, *Willd. Sp. Pl.* iii. 2395. S. microcephalus, *DC. Prodr.* v. 369; *Clarke Comp. Ind.* 97. S. indicus, *Kurz in Journ. As. Soc.* 1877, ii. 183; *Roxb. Hort. Beng.* 62; *Fl. Ind.* iii. 446. S. africanus, *Wall. Cat.* 3179, *in part.*

Plains of BENGAL and SILHET, and southwards to CEYLON and MALACCA, common in swamps.—DISTRIB. Persia. Africa. Malay Islds. China, Philippines and Australia.

Branches stout or slender, curved, ascending, wing entire. *Leaves* 1–3 in. Clusters of *heads* ¼–⅓ in. diam., very different from those of the former species, the bracts very small not imbricating nor spinulose, do not conceal the heads. Whole plant fragrant.

4. **S. indicus,** *Linn. Sp. Pl.* 1314; tomentose or villous, branches ascending with toothed wings, leaves obovate-oblong toothed or serrate, base narrowed and decurrent, clusters of heads on winged peduncles globose or shortly oblong, bracts short slender acuminate. *Burm. Fl. Zeyl.* t. 94, f. 3. S. indicus, *Willd. Sp. Pl.* iii. 2394. S. hirtus, *Willd. l. c.* 2395; *DC. Prodr.* v. 369; *Kurz in Journ. As. Soc.* 1877, ii. 183; *Clarke Comp. Ind.* 97; *Wall. Cat.* 3178; *Wight Ic.* t. 1094. S. africanus, *Wall. Cat.* 3179, *in part.* S. mollis, *Roxb. Hort. Beng.* 62; *Fl. Ind.* iii. 446; *DC. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 123.—*Rheede Hort. Mal.* x. t. 43.

TROPICAL HIMALAYA, ascending to 5000 ft., from KUMAON to Sikkim. ASSAM, SILHET, and southwards to CEYLON and SINGAPORE; common in rice fields.—DISTRIB. Africa, Malay Islds., Australia.

32. PTEROCAULON, *Elliott.*

Tomentose herbs. *Leaves* alternate, decurrent. *Heads* small, collected in globose, terminal or scattered or spicate clusters, heterogamous, disciform, yellow; outer fl. ♀, many-seriate, fertile, filiform, truncate or 2–3-toothed; disk-fl. ☿, few or solitary, usually sterile, tubular, slender, 5-toothed. *Involucre* ovoid or campanulate; bracts narrow, few-seriate, inner deciduous with the flowers, outer shorter; receptacle small, naked, hirsute or with deciduous bristles. *Anther-bases* sagittate; auricles connate, tailed. *Style-arms* of ☿ filiform, subobtuse. *Achenes* small, 4–5-ribbed; pappus slender, 1–2-seriate.—DISTRIB. Species 13, all tropical.

P. cylindrostachyum, *Clarke Comp. Ind.* 98; erect, densely woolly, leaves obovate or oblong obtuse serrate rugose decurrent, clusters of heads sessile globose. P. Billardieri, *F. Muell. Descr. Papuan Pl.* iii. 43; *Kurz in Journ. As. Soc.* 1877, ii. 182. Monenteles spicatus, *Labill. Sert. Nov. Caled.* 43, t. 43. Gnaphalium cylindrostachyum, *Wall. Cat.* 3931.

BIRMA and the EASTERN PENINSULA, from PEGU southwards.—DISTRIB. Philippine Islds. New Caledonia. Australia.

Robust, 1–2 ft. high; branches erect. *Leaves* 1–1½ in., white beneath. *Heads* ⅛ in., sessile, horizontal; invol. bracts shining; disk-fl. solitary. *Achenes* sparingly hairy.

33. BLEPHARISPERMUM, *Wight.*

Glabrous shrubs. *Leaves* alternate. *Heads* small, compressed, in solitary or crowded globose clusters which are sessile on an oblong or cylindric terminal receptacle, heterogamous, discoid; outer fl. ♀, few, fertile, very slender, 3–4-toothed; disk-fl. 2–8, ☿, fertile or not, tubular, 5-fid. *Invol. bracts* 1–2, like the pales, but shorter; receptacle minute or cylindric, with broad rigid pales enclosing the flowers. *Anther-bases* sagittate, auricles subcaudate. *Style-arms* of ☿ linear, stout, obtuse. *Achenes* obcompressed, black, outer on both faces with a ciliate rib, margins ciliate; pappus pales or bristles very unequal, or with 2–3 stronger ones at the angles, or 0 in the sterile achenes.—DISTRIB. 2 Tropical Indian and an African species.

1. **B. petiolare,** *DC. in Wight Contrib.* 12; *Prodr.* v. 368; leaves petioled ovate membranous acuminate, clusters of heads long-peduncled corymbose. *Clarke Comp. Ind.* 98; *Arnott in Mag. Zool. & Bot.* ii. 421; *Wight Ic.* t. 1092; *Deless. Ic. Sel.* iv. t. 19, f. 1.

TRAVANCORE; at Courtallam, *Wight.*

A glabrous shrub, branches slender. *Leaves* 3–7 in., acuminate; petiole ¼–¾ in. Clusters of *heads* ⅓–½ in. diam.; basal bracts broad; heads 4-fld.; ♀ fl. 2, pappus of a few bristles; achenes compressed, margins ciliate; fl. ☿ 2, pappus 0; achenes small, empty.

2. **B. subsessile,** *DC. in Wight Contrib.* 12; *Prodr.* v. 368; leaves subsessile ovate or elliptic obtuse coriaceous finely reticulate, heads solitary shortly peduncled. *Clarke Comp. Ind.* 98; *Wight Ic.* t. 1093; *Deless. Ic. Sel.* iv. t. 19, f. 2. Leucoblepharis subsessilis, *Arn. in Mag. Zool. & Bot.* ii. 422; *Dalz. & Gibs. Bomb. Fl.* 123; *Wall. Cat.* 7524 (*DC.*).

The CONCAN, CANARA and MYSORE; on the Ghats.

A glabrous undershrub, with a woody rootstock. *Leaves* 1½–5 by ¾–2½ in., shining on both surfaces, narrowed into the petiole. Clusters of *heads* globose, 1–1½ in. diam., with leafy bracts at the base, 5–10-fld.; fl. ♀ 2, pappus of a few hairs, achenes compressed almost villous with long hairs; fl. ♂ 3–8, pappus like the ♀ and achenes smaller.

34. ATHROISMA, *DC.*

A viscid glabrous or pubescent annual. *Leaves* alternate, petioled, pinnatifid. *Heads* small, in globose or ovoid terminal peduncled clusters which are sessile on a common cylindrical receptacle, heterogamous, disciform; outer fl. ♀, very few, filiform, 2–3-toothed, fertile; disk-fl. ☿, fertile, tubular, limb campanulate shortly 4-fid. *Invol. bracts* 1–2, like the pales, but shorter; receptacle cylindric, with broad dry pales enclosing the flowers. *Anther-bases* sagittate; auricles connate, acute. *Style-arms* of ☿ short, flattened, very obtuse. *Achenes* black, inner face flat, outer convex, margin ciliate; pappus a short stellately spreading fimbriate corona.

A. laciniatum, *DC. Prodr.* v. 369; *Clarke Comp. Ind.* 98. Sphaeranthus laciniatus, *Wall. Cat.* 3184 (*DC.*).

BENGAL, from the Hoogly at Rajmahal, eastwards to ASSAM, and southwards to BIRMA and TENASSERIM.—DISTRIB. Java.

Simple or branched from the base; branches ascending 6–18 in., soft. *Leaves* few, 1–2 in.; segments oblong, toothed. Clusters of heads ½–1½ in. long.

35. FILAGO, *Linn.*

Small woolly herbs. *Leaves* alternate. *Heads* small, sessile in crowded terminal and axillary clusters which are often enclosed by floral leaves, heterogamous, disciform; outer fl. ♀, ∞-seriate, fertile, filiform, 2-3-toothed; disk-fl. ☿, few, fertile or not; limb scarcely dilated, 4–5-toothed. *Invol. bracts* 2-∞-seriate, scarious, inner gradually passing into the pales, but shorter than these; receptacle cylindric, obconic or flat and constricted at the base; pales at the base of the outer of all the flowers, hyaline, concave. *Anther-bases* sagittate; auricles small, tails short slender. *Style-arms* of ☿ oblong or linear, obtuse. *Achenes* minute, subterete or compressed, tip rounded, not ribbed; pappus of inner ♀ and ☿ 1–2-seriate, slender, scabrid; of outer ♀ 0 or scanty. —DISTRIB. Species about 8, natives of the old world.

1. **F. germanica,** *Linn.*; *DC. Prodr.* vi. 247; woolly all over, branched from the base, branches dichotomous divaricating, leaves obovate-oblong apiculate, clusters of heads surrounded by leafy bracts longer than themselves, invol. bracts erect in fruit acuminate outer awned. *Clarke Comp. Ind.* 99. Gnaphalium hurdwaricum, *Wall. Cat.* 2951; *DC. l. c.* 231.

Plains and Mts. of NORTH-WESTERN INDIA, from Cawnpore in the plains and Kumaon in the Himalaya westward to Affghanistan, ascending to 8000 ft. in TIBET. —DISTRIB. Westwards to the Canaries.

An erect or prostrate slender annual. *Stems* or branches 2–6 in., flexuous. *Clusters* terminal in the forks of the branches, ¼–½ in. diam., shorter than the leafy bracts; heads 6–20, ⅛ in. long, glistening, yellowish.—The Indian specimens appear mostly to belong to the prostrate form, F. spathulata, *Presl* (*Boiss. Fl. Orient.* iii. 246), including F. prostrata, *Parlatore,* with the leafy bracts longer than the clusters.

2. **F. arvensis,** *Linn.*; *Boiss. Fl. Orient.* iii. 247; woolly all over, branched from the base, branches erect with erect divisions, leaves linear-lanceolate erect, clusters of heads axillary and terminal surrounded by leafy bracts shorter than themselves, invol. bracts spreading in fruit obtuse, outer with scarious tips. *Clarke Comp. Ind.* 99, *excl. syn.*

NORTH WEST INDIA, *Falconer.* WESTERN TIBET; Iskardo and Dras, alt. 7–9000 ft., *Clarke.*—DISTRIB. Westward to the Canaries.

There are two forms, one tall and stout, the other more slender and decumbent, like *F. germanica.* It is not a common North Western plant, as supposed by Clarke, who has confounded it with *F. germanica* in his "Compositæ Indicæ."

36. IFLOGA, *Cass.*

Herbs or small shrubs. *Leaves* alternate, small or slender, often clustered. *Heads* small, solitary or clustered, sessile, forming leafy spikes, heterogamous, disciform; outer fl. ♀, 1-∞-seriate, fertile, very slender, obscurely toothed; disk-fl. ☿, sterile, limb 5-toothed. *Invol. bracts* few; receptacle cylindric below or slightly elevated, top flat naked, with an outer ring of scarious pales as long as the bracts. *Anther-bases* sagittate, tails very slender. *Achenes* glabrous, of ♀ fl. small, oblong, pappus 0; of ☿ pappus hairs few, 1-seriate, feathery.—DISTRIB. Species 8, one Indian, the rest N. African.

I. Fontanesii, *Cass. in Dict. Sc. Nat.* xxiii. 14; annual, branched from the base, branches ascending densely leafy, leaves narrowly linear spreading

acute, heads 2–3-nate nestling amongst the leaves throughout the length of the branches reddish, invol. bracts scarious aristate. I. cauliflora, *Clarke Comp. Ind.* 99. I. spicata, *Schultz-Bip.*; *Boiss. Fl. Orient.* iii. 248. Trichogyne cauliflora, *DC. Prodr.* vi. 266. Gnaphalium spicatum, *Vahl.* G. anemophilum, *Wall. Cat.* 2943.

UPPER GANGETIC PLAINS, from Saharunpore westwards to the frontier.—DISTRIB. Westward to the Canaries.

Woolly or glabrate. *Branches* 4–6 in. high, 1 in. diam. across the leaves, densely clothed with leaves and heads. *Heads* $\frac{1}{6}$ in. long, glistening, glabrous; invol. bracts and pappus red.

37. ANTENNARIA, *Gaertn.*

Tufted perennial herbs, woolly or tomentose. *Leaves* spathulate, quite entire, radical, often rosulate. *Heads* solitary or in terminal corymbs, disciform, diœcious; fl. ♀ all fertile, filiform, truncate or minutely toothed; ☿ sterile, tubular, limb campanulate 5- rarely 4-fid. *Involucre* ovoid or campanulate; bracts ∞-seriate, scarious, innermost woolly; recept. convex or nearly flat, pitted, naked. *Anther-bases* sagittate, auricles connate caudate. *Styles* of ☿ undivided or 2-fid., tips obtuse or truncate. *Achenes* of ♀ small, oblong, terete or sub-compressed, not ribbed; pappus-hairs of ♀ copious, slender, connate at the base; of fl. ☿ fewer, crisped.—DISTRIB. Species about 10, mountain plants of various countries.

The diœcious flowers are the only character that distinguishes this genus from *Anaphalis.*

1. **A. nana,** *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 100; stemless, leaves spreading $\frac{1}{2}$–1 in., heads subsessile solitary, invol. bracts linear-lanceolate acute upper half and margins hyaline.

WESTERN TIBET; Nubra and Shayuk valleys, &c., alt. 12–14,000 ft., *Thomson.*

A densely tufted woolly herb, 1–3 in. high. *Leaves* linear spathulate or oblanceolate, woolly on both surfaces. *Heads* small, sessile amongst the leaves or shortly peduncled, $\frac{1}{2}$ in. diam., diœcious. *Pappus* copious, white, hairs slender, tips not dilated or bearded.—An anomalous *Antennaria*, the pappus of the ♀ not being bearded or dilated at the tip.

2. **A. muscoides,** *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 100; leaves minute densely imbricate, heads solitary sessile, invol. bracts linear-oblong subacute almost wholly hyaline.

SIKKIM HIMALAYA in the interior ranges; alt. 16–18,000 ft., *J. D. H.*

There are two forms of this, one is quite moss-like, very compactly tufted, forming great white cushions on the bare ground; its leaves are about $\frac{1}{18}$ in. long, closely imbricated with the rounded blade spreading starlike on the surface of the mass; the other grows more loosely, with spathulate spreading leaves $\frac{1}{3}$ in. long. Pappus hairs connate at the base, as are those of *A. nana.*

38. LEONTOPODIUM, *Br.*

Perennial tufted woolly herbs, with simple leafy flowering stems. *Leaves* quite entire. *Heads* small, sessile in involucrate clusters, disciform, unisexual or 2-sexual with the ♀ flowers outermost; fl. ♀ fertile, filiform, truncate or minutely toothed; fl. ☿ tubular, sterile, limb campanulate 5-fid. *Involucre* campanulate, bracts ∞-seriate, scarious, inner acute or with a spreading petaloid limb, outer smaller, outermost woolly; recept. convex, naked. *Anther-bases* sagittate, auricles with slender tails. *Styles* of ☿ usually entire, obtuse or truncate. *Achenes* of ♀ small, oblong, subterete, not ribbed; pappus hairs slender,

1-seriate, shortly bearded, bases sub-connate.—DISTRIB. Species 5, on the mountains of Europe and Asia.

L. alpinum, *Cass.*; *DC. Prodr.* vi. 275; *Reichb. Ic. Fl. Germ.* t. 947; *Clarke Comp. Ind.* 100. L. himalayanum, *DC. l.c.* L. monocephalum, *Edgew. in Trans. Linn. Soc.* xx. 73. Gnaphalium pulchellum, *Wall. Cat.* 2945.

ALPINE HIMALAYA and TIBET, ascending from 10,000 to nearly 18,000 ft.—DISTRIB. Alps of Europe and Central Asia.

This, the Edel-Weiss of the European Alps, is very variable in habit and in the length of foliage, amount of woolliness and size of the involucriform leaves; the rosulate lower leaves vary from obovate-oblong and ¼ in. long, to linear and 1–1½ in. long, equally woolly on both surfaces or less so or almost glabrate above; flowering stem 1–8 in., erect or ascending, slender or stout, sparingly or densely leafy or woolly; cauline leaves sessile or ½-amplexicaul, linear or linear-oblong, rarely obovate, obtuse or acute; involucriform leaves ⅓–1 in. long, linear or dilated upwards, spreading or recurved, almost always densely clothed with yellowish wool, always longer than the cluster of heads. *Heads* monœcious, ¼ in. long; invol. bracts erect, scarious, oblong-lanceolate, acuminate, tipped with purple. *Achenes* papillose if fertile, smooth if sterile; pappus hairs of ♀ filiform, of ♂ thickened towards the tips.

VAR. *Stracheyi*; stem 12 in. filiform nearly glabrous, radical leaves 0, cauline lanceolate acuminate base auricled cobwebby above, snow-white and woolly beneath.—Kumaon at Tola, alt. 11,500 ft., *Str. & Winterb.* Nipal, *J. Scully.* This appears to me to be a state of *L. alpina*, drawn up amongst rocks, but it is a very peculiar one.

39. ANAPHALIS, *DC.*

Perennial, rarely annual, erect, cottony or woolly, rarely pubescent or glabrate herbs. *Leaves* alternate. *Heads* small, corymbose, heterogamous with the ♀ fl. outermost, or unisexual or subdiœcious, disciform; fl. ♀ numerous, filiform, fertile, 2-4-toothed; fl. ☿ usually sterile, tubular, limb subcampanulate 5-fid. *Involucre* campanulate turbinate or sub-globose; bracts ∞-seriate, scarious, inner with a petaloid limb, outer shorter, outermost woolly; receptacle naked. *Anther-bases* sagittate; auricles connate, tailed. *Style* of ☿ filiform, obtuse, subcapitate or 2-cleft. *Achenes* very small, oblong; pappus hairs of ♀ 1-seriate, slender, scabrid, quite free and caducous, of ☿ often thickened at the tips.—DISTRIB. Species about 25, chiefly temperate and mountain plants of Asia and America.

It is difficult to conceive a more troublesome assemblage of plants to discriminate and describe than this genus presents. The following arrangement of the Indian species is quite artificial. I have vainly sought good characters in the number of the flowers and of ☿ and ♀ flowers in a head; these vary much in the same plant, and in different plants of the same species, and I suspect that the size of head which differs in very similar plants and which is relied on as a specific character in often only a sexual one. In some (as *A. oblonga*) the disk-flowers are all fertile, thus breaking down the character between this genus and *Gnaphalium*; in fact the differences between these genera and *Helichrysum*, *Antennaria* and *Leontopodium* are artificial and hardly sufficient for practical purposes.

SERIES I. *Heads* large, ½–⅔ in. diam. (except in *A. xylorhiza* and *Royleana*), more or less stellately spreading, acute or acuminate, white.—All Himalayan and mostly Alpine.

1. **A. nubigena,** *DC. Prodr.* vi. 272; dwarf, softly woolly or cottony, stems simple tufted 1–8 in., leaves elliptic or lanceolate or lowest obovate-spathulate 1-nerved acute or with a naked point or awn, base contracted, heads 1 or few ½–1 in. diam., invol. bracts lanceolate obtuse or subacute ¼ to more than ⅓ in. long.

ALPINE HIMALAYA and TIBET, alt. 12–16,000 ft. The following forms have very unstable characters.

VAR. 1. *nubigena proper*: stems 3–8 in. slender, leaves narrow and scattered usually $\frac{1}{4}$–$\frac{1}{2}$ in., heads solitary rarely 2–3 $\frac{2}{3}$–1 in. diam. A. nubigena, monocephala *and* mucronata, *DC. l. c.* A. nubigena *and* mucronata, *Clarke Comp. Ind.* 105, 106. Gnaphalium nubigenum, *Wall. Cat.* 2935.

VAR. 2. *intermedia*; slender, 3–8 in., leaves longer $\frac{1}{4}$–$\frac{3}{4}$ in. as in var. 1., heads 1–5 corymbose smaller often crowded. A. nubigena β. polycephala, *Clarke Comp. Ind.* 106. Antennaria triplinervis γ. intermedia, *DC. l. c.* 270. Gnaphalium intermedium, *Wall. Cat.* 2936, *in part.* This passes insensibly into *A. cuneifolia.* There is a great mixture of this and Var. 1 in Wallich's Herbarium, and from the description I suspect that De Candolle had specimens of the following under his eye when describing *A. triplinervis*, var. *intermedia*.

2. **A. cuneifolia,** *Hook. f.*; softly woolly or cottony, stems several ascending slender 6–12 in. often stoloniferous, leaves 1–2 in. linear-oblong or obovate-oblong or the lower spathulate $\frac{1}{2}$-amplexicaul acute and aristate, heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam. corymbose, invol. bracts $\frac{1}{3}$ in. lanceolate acute or obtuse white. Gnaphalium cuneifolium, *Wall. Cat.* 2934, *except left-hand specimen.* Antennaria triplinervis var. cuneifolia, *DC. Prodr.* vi. 270. Helichrysum stoloniferum and ? elegans, *Don Prodr.* 176. Elichrysum nepalense, *Spreng. Syst. Veg.* iii. 485.

TEMPERATE and ALPINE HIMALAYA; from 8–12,000 ft. in Kashmir, and from 9–13,000 ft. in Sikkim, abundant.

It is impossible to distinguish small states of this from large ones of *nubigena*. var. *intermedia*, though on the whole this retains its characters throughout the length of the Himalaya.

3. **A. Royleana,** *DC. Prodr.* 272; stems many from the root 4–6 in. woody below leafy, leaves $\frac{3}{4}$–$1\frac{1}{4}$ in. sessile linear or linear-oblong obtuse or acute woolly beneath or on both surfaces 1-nerved flat or margins recurved, heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. in rounded corymbs, invol. bracts $\frac{1}{6}$–$\frac{1}{4}$ in. ovate obtuse or acute white.

ALPINE HIMALAYA, alt. 9–15,000 ft.; Kunawar, *Royle*, &c.

VAR. 1. *Royleana proper*; leaves puberulous or scaberulous above. A. Royleana *and* polylepis, *DC. l. c.* A. polylepis, *Clarke Comp. Ind.* 104. Pangi and Werang Pass, alt. 10–13,000 ft.—Royle's specimens do not show the woody base of the stem, which is the only described difference between this and *A. polylepis*, DC., except the size of the heads, which vary much, being sometimes as small as in *A. contorta.* The invol. bracts vary in length and acuteness, and the outer have a broad thickened coloured claw as in *A. xylorhiza*. *A. Royleana* of Clarke (Comp. Ind. 104) is *A. Griffithii.*

VAR. 2, *concolor*; leaves uniformly clothed on both surfaces with soft white or grey tomentum rarely apiculate. A. chionantha, *Herb. Ind. Or. H. F. & T.* Gnaphalium canum, *Wall. Cat.* 2942, *in part.*—Alpine Himalaya, alt. 9–13,000 ft. Kunawar, *Jacquemont*, &c. Mana, *Edgeworth.* Sikkim, alt. 13–15,000 ft., *J. D. H.*

VAR. 3. *cana*; stems very numerous and slender, leaves 1–$1\frac{1}{2}$ in. more or less woolly or cottony on both surfaces very narrow margins often revolute. Antennaria chionantha, var. cana, *DC. l. c.* Gnaphalium canum, *Wall. Cat.* 2942, *in part.*—Specimens with broader leaves not revolute at the margin are with difficulty distinguished from forms of *A. cuneifolia.*

4. **A. Griffithii,** *Hook. f.*; stems 12–18 in. erect or ascending slender leafy, leaves beneath densely clothed with white or sub-cinnamomeous wool, leaves 1–$1\frac{1}{2}$ in. linear acute or apiculate $\frac{1}{2}$-amplexicaul above white or grey woolly or cobwebby 1-nerved margins flat or revolute, heads many $\frac{1}{2}$-in. diam. in usually open corymbs, invol. bracts $\frac{1}{6}$ in. ovate or elliptic-ovate subacute white. A. Royleana, ? *Herb. Ind. Or. Hf. & T.*; *Clarke Comp. Ind.* 104.

EAST NIPAL; Tambur river, alt. 6–8000 ft., *J. D. H.* KHASIA MTS., *Griffith* (Kew Dist. 3231), at Pomrang, alt. 5000 ft., *J. D. H. & T. T.*

I advance this species with great hesitation; it is intermediate between *Royleana* and *cinnamomea*, but is much larger than the former in all its parts and more robust, and it differs from the latter species in its smaller foliage and larger heads with more spreading bracts. This is certainly not *A. Royleana*, DC., of which I have seen authentic specimens since the distribution of the Indian Herbarium.

5. **A. triplinervis,** *Clarke Comp. Ind.* 105; stems rather stout often flexuous leafy and leaves beneath densely clothed with white wool, leaves 3–8 in. obovate or elliptic-oblong acute amplexicaul 3–5-nerved cobwebby above, heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam. in open or close corymbs, invol. bracts $\frac{1}{3}$ in. long ovate-lanceolate acute or subacute white. Antennaria triplinervis, *Sims Bot. Mag.* t. 2468; *DC. Prodr.* vi. 270, *excl.* var. β and γ; *Don Prodr.* 174. Gnaphalium perfoliatum, *Wall. Cat.* 2937. G. cynoglossoides, *Trevir. in Nov. Act. Nat. Cur.* xiii. i. 200.

TEMPERATE HIMALAYA; alt. 6–10,000 ft., from Kashmir to Bhotan.

A very much larger more robust plant than *A. nubigena*, var. *intermedia*, with the leaves sometimes 3 in. diam. and strongly amplexicaul or even auricled at the base; but small specimens come very close to large ones of that plant.

6. **A. subumbellata,** *Clarke Comp. Ind.* 108; pubescent and glandular, greenish brown when dry, stem 12–16 in. erect rather slender leafy, leaves 1–2 in. linear-oblong acute or apiculate $\frac{1}{2}$-amplexicaul obscurely 3-nerved green above and beneath lowest spathulate, margins flat, heads many $\frac{1}{2}$–$\frac{3}{4}$ in. diam. in rounded or subumbellate corymbs, invol. bracts nearly $\frac{1}{3}$ in. lanceolate acute white.

SIKKIM HIMALAYA; Lachoong valley, alt. 10–12,000 ft., *J. D. H.*

A very distinct species, rather viscid, with sweet-smelling foliage when fresh, as in *A. Hookeri*, which it a good deal resembles except in the larger heads.

7. **A. xylorhiza,** *Schultz-Bip. mss.*; clothed with soft spreading brown wool, root very stout woody twisted, crown divided into many densely tufted very short stout branches clothed with membranous leaf bases and tufted linear-spathulate leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long, flowering stems 1–3 in. scape-like with linear-oblong sessile leaves, heads many $\frac{1}{3}$ in. diam. clustered, invol. bracts about 15 $\frac{1}{5}$ in. long ovate subacute with a broad brown claw $\frac{1}{3}$ the length of the blade.

SIKKIM HIMALAYA; Tibetan region, alt. 10–17,000 feet., *J. D. H.* Bagdwar in Kumaon, alt. 8000 ft., *Strach. & Winterb.*

A very distinct species, gathered late, and I am hence uncertain whether the invol. bracts always spread in a flowering state, their form is more that of the next section. The plant in Herb. Strach. & Wint. has rather larger heads and more lanceolate invol. bracts, but is, I think, the same species.

SERIES II. *Heads* $\frac{1}{6}$–$\frac{1}{3}$ in. diam.; invol. bracts erect incurved or somewhat recurved, stellately spreading only after flowering.

* *Leaves flat, margins rarely recurved, 3-7-nerved.—Usually tall, stout, leafy species.* (*See* A. triplinervis *in Series I.*, A. oblonga *and* zeylanica *in* **).

8. **A. cinnamomea,** *Clarke Comp. Ind.* 104; stems 1–2 ft. usually simple rather robust leafy and leaves beneath densely clothed with white grey or cinnamomeous wool, leaves 2–4 in. spreading or horizontal tapering from the middle to a $\frac{1}{2}$-amplexicaul simple or auricled base and to the acute point glabrous or woolly above 3–5-nerved, heads very many subglobose $\frac{1}{4}$–$\frac{1}{3}$ in. diam., invol. bracts $\frac{1}{6}$ in. elliptic-ovate obtuse erect or incurved white opaque. Antennaria cinnamomea, *DC. Prodr.* vi. 270. A. Timmua, *Don Prodr.* 174. Gnaphalium cinnamomeum, *Wall. Cat.* 2944. G. Wightianum, *Thwaites Enum.* 166, *in part* (*C. P.* 568).

TEMPERATE HIMALAYA; from Kashmir, alt. 4–9000 ft. to Sikkim and Bhotan, alt. 5–10,000 ft. KHASIA MTS., alt. 4–6000 ft. CEYLON; central province, alt. 5–8000 ft., *Thwaites*.—DISTRIB. Upper Birma, N. China and Japan.

Very similar to the American, *A. margaritacea*, but the leaves are 3-nerved and usually cinnamomeous beneath; they vary from 1/6–2/3 in broad, and when very narrow are only 1-nerved, margins generally flat. Corymbs usually much branched.

9. **A. Hookeri,** *Clarke mss.*; stem 1–2 ft. simple or corymbosely branched glandular-pubescent leafy, leaves 2–4 in. spreading narrowly lanceolate tapering from the auricled ½-amplexicaul base to the acuminate point 3-nerved sparsely cobwebby or cottony and subglandular both surfaces greenish-brown when dry margins flat, heads very small 1/6 in. diam. globose in broad much-branched corymbs, invol. bracts 1/10 in. long broadly ovate obtuse white opaque.

SIKKIM HIMALAYA; Lachen and Lachoong valleys, alt. 9–11,000 ft., *J. D. H.*

A very distinct looking species, but allied to *A. subumbellata* in its glandular pubescence and habit.

10. **A. adnata,** *DC. Prodr.* vi. 274; stem simple stout leafy 2–4 ft. densely clothed with white silky or cottony wool, leaves 2–5 in. suberect obovate oblong sub-spathulate or lanceolate acute or obtuse leathery 1–3-nerved narrowed to the ½-amplexicaul base, heads numerous ¼–⅓ in. diam. subglobose in dense rounded clusters on the stout branches of a large corymb or in a simple terminal cluster, invol. bracts ⅛ in. long rounded-ovate obtuse white opaque. *Clarke Comp. Ind.* 108. Gnaphalium adnatum, *Wall. Cat.* 2948.

TEMPERATE HIMALAYA, alt. 6–8000 ft., from Simla eastwards to Bhotan. KHASIA MTS., alt. 4–6000 ft. MARTABAN, alt. 5–7000 ft.

In its fullest development much the largest, stoutest, and largest-leaved Indian species, with stem as thick as the middle-finger, and obovate-spathulate 3-nerved leaves attaining 1½ in. diam.; it, however, grows more slender with leaves ¼ in. diam. and 1–nerved. The white woolly clothing is very uniform; the root appears annual.

11. **A. fruticosa,** *Hook. f.*; shrubby, branches stout terete woody covered below with persistent leaf-bases produced beyond the leaves into a long slender cottony flowering branch, leaves 1–2 in. crowded spreading oblanceolate obtuse narrowed from beyond the middle 3-nerved coriaceous margins flat glabrous above beneath clothed with appressed cinnamomeous wool, heads many ⅓ in. diam. campanulate in a large branched open corymb, longer invol. bracts ¼ in. narrowly obovate-oblong obtuse recurved white shining. Gnaphalium Wightianum, *Thwaites Enum.* 166 (C.P. 132).

CEYLON; Adam's Peak, *Thwaites*.

Apparently a very distinct species, but I have seen only one specimen; it differs wholly from *Wightiana* in habit, form and colour of foliage, and in the campanulate heads. The woody terete branch is nearly as thick as a goose-quill, the leaves are widest beyond the middle and coloured underneath like *A. cinnamomea*, which differs in the globose heads with broader shorter bracts. It is most like a very large form of *A. marcescens*, but the large heads and bracts are quite different.

12. **A. Beddomei,** *Hook. f.*; clothed with appressed grey cottony wool, stem stout 1–2 ft. leafy simple, leaves 2–3 in. elliptic-lanceolate from a sessile ½-amplexicaul narrowed base strongly 5- (upper 3-) nerved, heads 1/6 in. diam. sessile subglobose in dense rounded corymbose clusters, invol. bracts ⅛ in. elliptic-oblong obtuse white glistening.

WESTERN PENINSULA, *Beddome*.

A beautiful species, just received from Colonel Beddome without locality, easily recognised by the elliptic lanceolate 5-ribbed leaves. There are about as many ♀ as hermaphrodite flowers, and it may be referable to *Gnaphalium*.

** *Leaves* 1- (*very rarely* 3-) *nerved*, ½–4 *in.: margins usually flat, or slightly recurved when dry, but strongly recurved in many forms, more rarely in* araneosa. (*See also* A. contorta *and* zeylanica *in* ***.)

13. **A. araneosa,** *DC. Prodr.* vi. 109; stem 1–3 ft. erect usually much branched more or less winged by the decurrent leaf-bases pubescent and glandular or cottony or woolly leafy, leaves suberect or spreading 1–4 in. tapering from a narrow or broad ½-amplexicaul often auricled and sometimes decurrent base to an acuminate point, margins generally recurved at the base only puberulous or cottony beneath or on both surfaces 1-nerved, heads ⅙–¼ in. diam. subglobose in subglobose clusters or in large open much branched corymbs, invol. bracts $\frac{1}{12}$–$\frac{1}{10}$ in. elliptic obtuse white opaque. *Clarke Comp. Ind.* 109. Gnaphalium Busua, *Ham. in Don Prodr.* 173. G. semidecurrens, *Wall. Cat.* 2947 A. G.? decurrens, *Ham. in Wall. Cat.* 2939. ? G. villosissima, *Don Prodr.* 175.

TEMPERATE HIMALAYA; from Marri and Simla, alt. 5–8000 ft., to Sikkim, alt. 6–10,000 ft. KHASIA MTS., alt. 4–7000 ft.

I find it impossible to limit the varieties of this in respect of glabrousness or woolliness. Royle's specimens have a very little cottony wool, but are otherwise puberulous or glandular only, and the same form occurs in the Khasia; Wallich's *semidecurrens* has leaves white and cottony beneath, and others are cottony and white all over. A Khasian form connects it with *A. contorta*. The glandular forms are sweet-scented like *A. subumbellata*, which has never so broadly branched a corymb.

14. **A. oblonga,** *DC. Prodr.* vi. 174; softly cottony and white, stems usually many ascending from the root 4–18 in. slender or stout leafy, leaves ¾–1½ in. erect and spreading oblong or obovate or linear-oblong acute from a broad ½-amplexicaul base rarely narrowly linear cottony on both surfaces, margins flat, nerves 1 rarely 3 very obscure, heads turbinate ⅙ in. diam. sessile densely crowded in rounded corymbose clusters, invol. bracts ⅙ in. linear-oblong white or pink glistening. *Clarke Comp. Ind.* 112. Gnaphalium indicum, *Thwaites Enum.* 166. G. subdecurrens, *DC. in Wight Contrib.* 21. G. semidecurrens, *Wall. Cat.* 2947 B.

WESTERN GHATS, from the BABABOODEN to the PULNEY MTS., alt. 6–8000 ft., *Heyne*, &c. CEYLON; central Province, ascending to 7000 ft.

The uniform white cottony clothing and usually short broad leaves with flat margins and indistinct midrib beneath, small heads, and acuminate bracts, distinguish this at once from the others. It is exceedingly variable in habit. *Gnaphalium subdecurrens*, DC., is no doubt, as Wight states, a state of *A. oblonga* with perfect disk flowers, the styles of which are 2-fid (as indeed they are in most of the Indian species); it unites *Gnaphalium* with *Anaphalis*. I find the same character in Ceylon specimens, whence Thwaites technically referred the plant to *Gnaphalium*, though it is not Linnæus's *G. indicum*. The globose clusters of heads are sometimes disposed in forked cymes.

VAR. *elliptica*; stem stouter more leafy upwards, leaves broader sometimes 1 in. diam. obscurely 3–5-nerved. A.? elliptica, *DC. Prodr.* vi. 274; *Wight Ic.* t. 1118 (bad); *Clarke Comp. Ind.* 112.—Neilgherry Mts., *Wight*, &c.—I do not see how this is distinguished, except by habit, from *A. oblonga*. Clarke describes the invol. bracts as yellow, but they are as often white or pink. Styles of the ☿ fl. deeply cleft.

VAR. *Lawii*; stout, erect, very cottony and leafy, leaves 1–3 in. linear obtuse or acute, invol. bracts white or pale straw coloured.—Bababooden hills, *Law*; Mercara, *Hohenacker*.

15. **A. Stoliczkai,** *Clarke Comp. Ind.* 108; grey with thin cottony pubescence, stem much corymbosely branched leafy, leaves 1–1½ in. linear-oblong or ovate from a broad base acute 1-nerved, margins flat, heads ¼ in. diam., peduncles subcampanulate forming small corymbs terminating the branches,

invol. bracts few $\frac{1}{6}$ in. linear-oblong obtuse somewhat recurved lower half hard green upper white opaque.

WESTERN TIBET, alt. 5–10,000 ft., *Stoliczka, Jaeschke.*

The only specimen I have seen is the top, 10 in. long, of a stem, which is flexuous and gives off many slender branches terminated by the corymb. Clarke states that its discoverer found it in many places in Tibet. Its nearest ally is *A. virgata*, which differs in the narrow leaves with revolute margins and the less hardened invol. bracts; but I suspect it to be a state of that plant.

16. **A. Thwaitesii,** *Clarke Comp. Ind.* 110; thickly clothed except sometimes the leaves above with dense white or buff cottony wool, stem short stout very woody much branched below, branches 6–10 in. stout below and densely leafy, above slender and sparsely leafy, leaves $\frac{3}{4}$–1 in. spreading obovate-oblong or spathulate thick obtuse nerveless, margins flat, upper smaller, heads $\frac{1}{3}$ in. diam. turbinate peduncled, invol. bracts $\frac{1}{4}$ in. elliptic-lanceolate acute white rather spreading. Gnaphalium Wightii, *Thwaites Enum.* 165, *in part* (C.P. 528, 2048).

CEYLON; Central Province, alt. 7–8000 ft., *Walker*, &c.

A handsome and very distinct species, with large white heads approaching those of Series I.

17. **A. Notoniana,** *DC. Prodr.* vi. 273; thickly clothed with soft tawny wool, subcorymbosely branched from the base, branches 4–8 in. stout uniformly leafy throughout corymbosely branched at the top, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. often imbricate erect and recurved oblong from a broad $\frac{1}{2}$-amplexicaul base very obtuse equally woolly above and beneath 1-nerved, heads $\frac{1}{5}$ in. diam. campanulate or crowded in branched corymbs, invol. bracts $\frac{1}{6}$ in. erect and densely imbricate in many series oblong obtuse scarious wrinkled yellow or pinkish glistening. *Wight Ic.* t. 1116; *Clarke Comp. Ind.* 109. Helichrysum Notonianum, *DC. in Wight Contrib.* 20. Gnaphalium Notonianum, *Wall. Cat.* 2952. G. Sp., *Wall. Cat.* 2933 (*according to De Candolle*).

NILGHERRY MTS., alt. 8000 ft., *Noton*, &c.; at Ootacamund and Cochin, *Wight.*

A remarkable species; the invol. bracts are quite unlike those of any other. The single nerve of the leaf is seen only after removal of the thick wool; the leaf-margins seem never to be recurved except at the very base.

18. **? A. cutchica,** *Clarke Comp. Ind.* 111; thinly clothed with grey cottony wool, branches 6–10 in. from a woody stock leafy below very slender and nearly leafless above, leaves 1–2 in. slender gradually dilated upwards from a narrow base acute 1-nerved, heads $\frac{1}{6}$ in. long few subcorymbose oblong, invol. bracts $\frac{1}{6}$ in. few erect linear-oblong obtuse hard yellow shining.

CUTCH, *Dr. Stoliczka.*

Very distinct from any foregoing species, but possibly not an *Anaphalis*, which the involucre is very unlike; the specimens are insufficient to determine this point.

*** *Leaves* $\frac{1}{2}$–4 *in.,* 1-*nerved; margins usually strongly recurved, but often flat in* A. contorta *and* zeylanica. (*See also under* ** A. araneosa *and* oblonga.)

19. **A. contorta,** *Hook. f.*; stems 4–24 in. stout or slender, branches prostrate or ascending leafy and leaves beneath or on both surfaces cottony, leaves $\frac{1}{2}$–1 in. sessile $\frac{1}{2}$-amplexicaul often very crowded spreading and twisted narrowly linear or oblong from usually a broad or auricled base acute or obtuse 1-nerved, margins often revolute, heads $\frac{1}{6}$ in. diam. subglobose in dense simple or lobed contracted corymbose clusters, invol. bracts $\frac{1}{10}$ in. broadly ovate or oblong obtuse white or yellowish, outer often purplish with broad coloured glistening

bases. A. tenella, *DC. Prodr.* vi. 273, *excl. Syn. of Don*; *Clarke Comp. Ind.* 107. A. Falconeri, *Clarke, l. c.* 107. Antennaria contorta, *Don in Bot. Reg.* t. 605; *Prodr.* 175; *DC. Prodr.* vi. 271. Gnaphalium tenellum *and* simplicicaule, *Wall. Cat.* 2941, 2946. G. contortum, *Ham.*; *Spreng. Syst. Veg.* iii. 479.

TEMPERATE and SUBALPINE HIMALAYA, common, from 9–11,000 ft. in Kashmir to 7–13,000 ft. in Sikkim. MISHMI HILLS, *Griffith.* KHASIA MTS., alt. 4–7000 ft.

Very variable; branches usually woody below, even when slender above, with sometimes many very short arrested leafy shoots. *Leaves* quite linear or narrowed downwards, or oblong.—De Candolle's *A. tenella* is founded on small young specimens of Wallich's, with linear leaves hardly auricled at the base, and coloured outer invol. bracts; but the usual forms of *A. contorta* have long strict branches clothed with almost narrow leaves that taper from a broad cordate base; some Kunawur specimens have oblong obtuse leaves with crisped recurved margins, quite unlike the normal state of the plant. A very large form from Bhotan and Mishmi approaches *A. cinnamomea*, but has small heads. Some Khasian specimens have leaves somewhat decurrent, and appear to pass into a form of *araneosa*; others have quite the habit of *A. brevifolia*; still others from the higher Himalaya resemble small-headed specimens of *A. Royleana*; and a few forms are with difficulty distinguished from *A. virgata*, except by the sessile heads. The name *tenella* is quite inapplicable to this plant in any of its forms, and as De Candolle, who first described it under that name, confounded it with Don's *Helichrysum stoloniferum*, his name had better be suppressed for the very applicable and generally known one of *contorta*, under which it is well described by Don and De Candolle, and figured in the Botanical Register.

20. **A. virgata,** *Thoms. in Clarke Comp. Ind.* 107; wholly clothed with softly cottony wool, stems many 8–16 in. slender strict erect rigid from a woody stock simple or corymbosely branched above, leaves 1–1½ in. spreading narrowly linear from a broad or narrow base apiculate, margins flat or recurved, heads ⅛–⅙ in. diam. campanulate very numerous peduncled in open branched corymbs, invol. bracts ⅙ in. long linear-oblong obtuse lower half rigid upper white or yellowish.

KUNAWUR, LAHUL, and WESTERN TIBET, alt. 8–13,000 ft., *Jacquemont, Thomson,* &c.

A very distinct species; the leaves have usually narrow bases, and vary from $\frac{1}{12}$–⅓ in. diam., in the latter case they are flat and elliptic-lanceolate; the individual heads are usually peduncled. *A. Stoliczkai* may be a form of this.

21. **A. leptophylla,** *DC. Prodr.* vi. 273; clothed with white cottony wool, stems 6–18 in. very slender sparingly branched leafy, leaves 1–1½ in. sessile linear slender apiculate cottony on both surfaces, margins strongly recurved, heads few ⅓ in. diam. peduncled, invol. bracts ⅕ in. linear-lanceolate acute or acuminate rather spreading white, flowers numerous. *Clarke Comp. Ind.* 111. Helichrysum leptophyllum, *DC. in Wight Contrib.* 20.

NILGHERRY MTS., alt. 6–8000 ft., *Wight,* &c.

The cottony white clothing, together with its very slender habit, narrow leaves, and usually peduncled heads with spreading invol. bracts (as in Series I.), distinguish this from all but *A. brevifolia*, which has shorter closer leaves.

22. **A. aristata,** *DC. Prodr.* vi. 274; stem woody below, branches 12–24 in. stout pubescent or tomentose woolly above leafy, leaves 2–4 in. spreading and recurved narrow gradually tapering from a broad auricled ½-amplexicaul base to a very slender recurved point puberulous or hoary above cottony or woolly beneath, midrib strong beneath, margins recurved, heads $\frac{1}{10}$ in. diam. turbinate in densely corymbose globose clusters, invol. bract linear-oblong obtuse erect white yellowish or pink glistening. *Wight Ic.* t. 1119; *Clarke Comp. Ind.* 112.

NILGHERRY MTS., *Wight,* &c.

The leaves are described by both De Candolle and Wight as shortly decurrent, but

they are not so in the very numerous specimens examined. In habit, pubescence, foliage, colour, and inflorescence this very much resembles *A. Wightiana*, but the heads are quite minute turbinate and few-flowered, and the leaves usually taper to a very fine point.

23. **A. Wightiana,** *DC. Prodr.* vi. 273; stems woody and branched below, branches stout ascending leafy loosely cottony and woolly, leaves $\frac{3}{4}$-$1\frac{1}{2}$ in. erect and recurved broadly linear from a $\frac{1}{2}$-amplexicaul base obtuse scabrid above loosely cottony and whitish beneath, midrib strong beneath, margins strongly recurved, heads $\frac{1}{4}$ in. diam. sessile turbinate densely packed in rounded corymbose clusters, invol. bracts $\frac{1}{8}$ in. long linear-oblong subacute white glistening. *Wight Ic.* t. 1117; *Clarke Comp. Ind.* 111. Gnaphalium Wightianum, *DC. in Wight Contrib.* 21; *Wall. Cat.* 2940 B.

NILGHERRY MTS., alt. 6–7000 ft., *Wight*, &c.

A good deal like *A. aristata*, but the heads are much larger, with numerous flowers, and the invol. bracts are acute. Leaves usually rounded at the tip, but with sometimes a recurved awn.

24. **A. zeylanica,** *Clarke mss.*; stem 6–18 in. ascending puberulous or glabrate below cottony above, leaves 1–$1\frac{1}{2}$ in. linear-oblong from a broad $\frac{1}{2}$-amplexicaul base obtuse or apiculate 1–3-nerved, glabrous on both surfaces or cottony beneath rarely above, margins recurved often decurrent, heads turbinate $\frac{1}{4}$–$\frac{1}{3}$ in. diam. sessile or peduncled, invol. bracts $\frac{1}{6}$ in. spreading oblong subacute or obtuse white opaque with a slender dark claw. A. Wightiana, *Thwaites Enum.* 166 (C.P. 1763 and 568).

CEYLON; Central Province, alt. 5–6000 ft., in rocky places, *Walker*, *Thwaites*, &c.

A very variable plant; the colour and habit is that of *A. aristata*, but the large usually peduncled heads are quite different, and resemble more those of *A. brevifolia.* Thwaites himself is puzzled by it, and sends it under three forms—1, from Newera Ellia, with usually glabrous leaves; 2, from Pedrolatagala, with the young leaves woolly on both surfaces, and broader more obtuse invol. bracts; 3, a form from Newera Ellia, referred to *G. semidecurrens*, with very narrow acuminate leaves 2 in. long, cottony beneath, and invol. bracts as in 2. This last Clarke inclines to regard as a form of *A. marcescens*, in which the bracts are usually scarious and undulated, and the leaves broader beyond the middle and cinnamoneous beneath; it may be a hybrid.

25. **A. marcescens,** *Clarke Comp. Ind.* 110; stems slender woody much branched leafy and leaves beneath densely clothed with fulvous cottony wool, leaves 1–$1\frac{1}{2}$ in. spreading recurved or reflexed very narrow linear from a narrow base or slightly dilated upwards glabrous above 1-nerved, margins strongly recurved, heads $\frac{1}{6}$ in. diam. turbinate sessile or peduncled in very dense rounded subcorymbose clusters, invol. bracts $\frac{1}{8}$–$\frac{1}{5}$ in. obovate-oblong, outer with rounded tips very membranous transversely waved glistening, inner spreading with a short white subacute or obtuse limb. A. linearis, *DC.?*; *Schultz-Bip. mss. in Herb. Hohen.*, n. 649. Gnaphalium marcescens, *Wight Ic.* t. 1115. G. cinnamomeum, *Schultz-Bip. l. c.*, n. 134.

NILGHERRY MTS., *Wight*, &c. CEYLON; Central Province, alt. 7–8000 ft., *Walker*, &c.

The slender, woody, much branched, twiggy habit, coriaceous narrow leaves, glabrous above, with revolute margins, and close, usually fulvous-brown cottony tomentum, well distinguish this species. The heads of the Ceylon specimens are rather larger than the continental. *A. fruticosa* may be a very large state of this.

**** *Leaves $\frac{1}{6}$–$\frac{1}{3}$ in. long, very narrow, margins revolute.*

26. **A. brevifolia,** *DC. Prodr.* vi. 273; clothed with white cottony wool, stem much branched below, branches very slender erect densely leafy, leaves

very many $\frac{1}{4}$–$\frac{1}{2}$ in. 1-nerved and cottony on both surfaces, lower spreading linear-oblong obtuse with recurved margins, upper erect often imbricate narrower, heads $\frac{1}{3}$ in. diam. peduncled, invol. bracts $\frac{1}{5}$ in. oblong-lanceolate obtuse rather spreading and incurved white opaque. *Clarke Comp. Ind.* 110. Gnaphalium brevifolium, *Thwaites Enum.* 166, *excl. syn.*

WESTERN PENINSULA; Anamallay hills, *Wight.* CEYLON; central province, alt. 6–7000 ft., *Macrae*, &c.

A very distinct plant, if not a slender very elongate var. of *A. neelgerriana* (some specimens have similar flowerless, short, leafy branches), it appears, however, to be an annual, or at most a biennial, and has usually much larger heads than the last named. A Khasian form of *A. contorta* resembles this a good deal.

27. **A. neelgerriana,** *DC. Prodr.* vi. 272; wholly clothed with cottony wool, branches very many crowded on a stout perennial woody stock, some very short densely leafy flowerless, others 4–10 in. long and flower-bearing, leaves $\frac{1}{6}$–$\frac{1}{2}$ in. narrowly linear those on the flowerless branches and base of the flowering most dense spreading and reflexed, on the upper part of the flowering branches erect, all acute with recurved margins, heads $\frac{1}{6}$–$\frac{1}{4}$ in. diam. sessile most densely crowded or solitary or in corymbose clusters, invol. bracts $\frac{1}{6}$ in. long elliptic-oblong or lanceolate obtuse or acute white opaque. *Wight Ic.* t. 478; *Clarke Comp. Ind.* 110. Gnaphalium neelgerrianum, *DC. in Wight Contrib.* 21. G. nilagiricum, *Schultz-Bip. in Herb. Hohenack*, n. 1038.

NILGHERRY MTS.; alt. 7–8000 ft., *Wight*, &c.

Under *A. brevifolia*, its only near ally, I have indicated the differences between that plant and this, but they are far from satisfactory.

40. LASIOPOGON, *Cass.*

Minute, much branched, densely woolly annuals. *Leaves* alternate, quite entire. *Heads* in crowded clusters, heterogamous, disciform; fl. all fertile, outer ♀, 2-seriate, filiform, toothed; disk-fl. ☿, few or many, slender, limb dilated 3-toothed. *Involucre* campanulate; bracts few-seriate, inner subhyaline, outer woolly; receptacle small, naked. *Anther-bases* sagittate, tails slender. *Style-arms* of ☿ slender, truncate. *Achenes* subfusiform; pappus-hairs 1-seriate, separately caducous, feathery.—DISTRIB. Species 2, oriental and African.

L. lanatum, *Cass. in Dict. Sc. Nat.* xxv. 302; branches many from the root filiform prostrate, leaves linear-oblong or spathulate, heads in globose villous clusters subtended by floral leaves of their own length, invol. bracts linear obtuse scarious. L. muscoides, *DC. Prodr.* vi. 246; *Boiss. Fl. Orient.* iii. 224. Gnaphalium muscoides, *Desfont. Fl. Atlant.* ii. 267, t. 231.

The PUNJAB; Peshawur, *Vicary, Aitchison.*—DISTRIB. Westwards to Algeria and Spain. South Africa.

Whole plant 1–2 in. diam., looking like a cluster of cottony balls on the ground, both leaves and flowers being hidden by the woolly clothing; the leaves are $\frac{1}{10}$–$\frac{1}{4}$ in. long, and the heads about $\frac{1}{8}$ in. long.

41. PHAGNALON, *Cass.*

Shrubs, cottony or woolly, rarely perennial glabrous herbs. *Leaves* alternate, entire or sinuate-toothed. *Heads* solitary or fascicled, yellow, heterogamous, disciform, flowers all fertile; outer fl. ♀, ∞-seriate, filiform, minutely 2–3-toothed; ☿ slender, tubular, limb hardly dilated 5-fid. *Involucre* campanulate or ovoid; bracts ∞-seriate, dry, subulate or ovate-lanceolate, tips scarious, outer smaller; receptacle flat, naked or pitted. *Anther-bases* entire or sagittate,

sometimes minutely tailed. *Style-arms* of ♀ slender, obtuse, truncate or subcapitate. *Achenes* small, not ribbed; pappus hairs 1-seriate, slender, rigid, persistent.—DISTRIB. About 14 species, Mediterranean and W. Asiatic.

P. niveum, *Edgew. in Trans. Linn. Soc.* xx. 68; branches and leaves beneath snow-white with dense cottony wool, leaves from obovate to elliptic-oblong or linear-oblong entire or sinuate-toothed, heads axillary.—P. denticulatum, *Clarke Comp Ind.* 113, and *Herb. Ind. Or. H. f. & T., not of Dcne.*

WESTERN HIMALAYA and WESTERN TIBET; from Garwhal to Kashmir, alt. 6–8000 ft.

Branches 4–10 in., short and leafy or slender with scattered foliage. *Leaves* 1–1½ in., sometimes spathulate and much narrowed into the sessile base, glabrous or cottony above. *Heads* ⅓–½ in. diam.; peduncles 1–3 in., slender; invol. bracts subulate, straight, gradually narrowed to an acicular point, purplish, cottony and hoary.—Elongated branches a good deal resemble *P. acuminatum*, Boiss. of Beluchistan, but the invol. bracts are different.

42. GNAPHALIUM, *Linn.*

Hoary or woolly herbs. *Leaves* alternate, quite entire. *Heads* small, in terminal or axillary corymbs or fascicles, heterogamous, disciform; flowers all fertile, outer ♀, 2-∞-seriate, filiform, 3-4-toothed; disk-fl. ☿, fewer, slender, limb dilated 5-toothed. *Involucre* ovoid or campanulate; bracts ∞-seriate, all scarious or with a white yellow or brown more or less scarious blade; receptacle naked or pitted. *Anther-bases* sagittate, cells with slender tails. *Style-arms* of ☿ truncate or capitate. *Achenes* oblong or obovoid, not ribbed; pappus-hairs 1-seriate, slender or thickened at the tip, caducous, connate at the base or not.—DISTRIB. Cosmopolitan. About 100 species.

This genus is hardly distinguishable from *Helichrysum* and from *Anaphalis*, of which *G. luteo-album* and *hypoleucum* have entirely the habit.

* *Heads in corymbose leafless clusters.*

1. **G. luteo-album,** *Linn.*; *Boiss. Fl. Orient.* iii. 224; woolly, stem corymbosely branched above, leaves woolly on both surfaces oblong-spathulate obtuse upper lanceolate acute ½-amplexicaul, heads whitish yellow or brown shining, invol. bracts oblong obtuse, achenes tubercled or with minute curved bristles. *Clarke Comp. Ind.* 114. G. orixense *and* G. albo-luteum, *Roxb. Fl. Ind.* iii. 425.—Synanthera, *Wall. Cat.* 7415.

Throughout INDIA; from Kashmir to Birma and southwards to Martaban, ascending to 10,000 ft. in Sikkim. -DISTRIB. Most hot and warm temperate counties.

A very variable annual 4–12 in. high, with leaves 1–2 in. long, rarely more than ⅓ in. broad, and leafless, dense corymbose clusters of glistening heads. The European form with very pale heads does not occur east of Affghanistan; the two following extend eastwards to Japan.

VAR. 1. *multiceps*; stems usually many from the root, heads golden-yellow.—G. multiceps, *Wall. Cat.* 2949; *DC. Prodr.* vi. 222. G. ramigerum *and* confusum, *DC. l. c.* G. affine, *Don Prodr.* 173. G. martabanicum, *Wall. Cat.* 2950.—The Himalaya and Khasia Mts., near the foot of the hills, rarer on the plains. Martaban, *Wallich.* Mt. Aboo, *King.*

VAR. 2. *pallidum*; heads pale brown.—G. pallidum, *Ham. in Wall. Cat.* 2953. Very common.

2. **G. hypoleucum,** *DC. in Wight Contrib.* 21; *Prodr.* vi. 222; stem above and leaves beneath woolly, leaves sessile linear acuminate puberulous or scaberulous above, base dilated ½-amplexicaul, heads many in corymbose dense

clusters, invol. bracts oblong obtuse yellowish or golden glistening, achenes papillose. *Clarke Comp. Ind.* 114; *Wight Ic.* t. 1114.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 3–7000 ft. KHASIA MTS., alt. 3–5000 ft. MARWAR, Mt. Aboo, *Herb. Dalzell, King.* NILGHERRY MTS., alt. 5–7000 ft.—DISTRIB. China, Japan, Abyssinia.

A usually taller and often stouter annual than *G. luteo-album*, easily distinguished by the longer very acuminate leaves woolly beneath only, with often broadly auricled bases. The Nilgherry specimens have paler heads.

** *Heads in leafy spikes.*

3. **G. indicum,** *Linn*; *DC. in Wight Contrib.* 22; *Prodr.* vi. 231; softly cottony, stems many from the root ascending leafy, leaves linear-obovate or spathulate apiculate, heads $\frac{1}{8}$ in. diam. in simple or branched leafy spikes or racemose clusters, invol. bracts linear-oblong acute pale reddish-brown or yellowish, achenes minutely papillose, pappus-hairs not coherent at the base. *Wall. Cat.* 2954; *Boiss. Fl. Orient.* iii. 225; *Clarke Comp. Ind.* 114; *Dalz. & Gibs. Bomb. Fl.* 130; G. strictum *and* multicaule, *Roxb. Fl. Ind.* iii. 424, 425. G. nilaicum, *Raddi*; *DC. l. c.* G. spathulatum, *Del. Fl. Ægypt.* 122, t. 44, f. 2, *not of Lamk.*

Throughout INDIA on the plains, from the Punjab eastwards to Birma and Martaban, ascending 1000 ft. in the Himalaya.—DISTRIB. Westwards to Senegal and eastwards to China, Japan and Australia.

Branches slender, 4–6 in. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. *Heads* $\frac{1}{8}$ in. diam., sometimes crowded and forming ovoid clusters.

G. PURPUREUM, *Linn.*; *DC. Prodr.* vi. 182; annual, sparsely cottony, stems many from the root stout ascending, leaves spathulate tip broadly rounded, heads $\frac{1}{4}$ in. diam. in spicate globose clusters, invol. bracts linear subacute shining, achenes minutely papillose, pappus-hairs cohering at the base.

UPPER GANGETIC plain, *Falconer.* Jugulliri, *Edgeworth.* Meerut, Moradabad and Bignore, *Thomson*, no doubt introduced.—DISTRIB. N. & S. America.

This closely resembles *G. indicum*, but is a very much larger stouter plant, with stems 12–18 in. high, and leaves attaining 4 inches; the heads, too, are twice as large. Amongst a very large suite of specimens of *indicum*, from all parts of India I find none approaching this. The cohesion of the pappus hairs by their very base is a very marked character.

4. **G. Stewartii,** *Clarke mss.*; cottony, stem short leafy, leaves linear erect or recurved acute radical rosulate, heads $\frac{1}{4}$ in. diam. in lax or dense leafy racemes, invol. bracts linear-oblong acute and obtuse chestnut-brown, achenes subsilky or scabrid, pappus-hairs not cohering.

WESTERN HIMALAYA, *Stewart.* KASHMIR, alt. 10,000 ft., *Aitchison.* WESTERN TIBET; Karakoram, alt. 13,000 ft., *Clarke.*

Perennial? *Stems* tufted, 2–4 in., elongating in fruit. *Leaves* $\frac{1}{2}$–1 in., very narrow. *Heads* usually peduncled; invol. bracts a dark rich brown. *Flowers* few.

*** *Heads in rounded leafy axillary or terminal clusters.*

5. **G pulvinatum,** *Delile Fl. Ægypt.* 122, t. 44, f. 1; woolly, stems very many spreading from the root short prostrate, leaves small spathulate, heads minute $\frac{1}{12}$ in. hidden amongst the bases of the crowded spreading terminal leaves and immersed in wool, invol. bracts slender linear recurved green with acute hyaline tips, achenes slender minutely papillose. *DC. Prodr.* vi. 231; *Boiss. Fl. Orient.* iii. 225. G. crispatulum, *Clarke Comp. Ind.* 115. G. depressum, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 425. G. prostratum, *Roxb. in Wall. Cat.* 2955. Filago prostrata, *DC. in Wight Contrib.* 22; *Prodr.* vi. 249. Evax indica, *Ham. in Wall. Cat.*

Throughout the plains of INDIA, from the Punjab and Scind to Pegu, Ava and the Deccan.—DISTRIB. Egypt.

This closely resembles the *G. crispatulum*, Del., also a Nile Valley plant, but is distinguished by the narrow acute invol. bracts.

6. **G. Thomsoni,** *Hook. f.*; softly cottony, stems rather stout erect simple or many from the root erect leafy, leaves linear acute, heads $\frac{1}{6}$ in. diam. in sessile globose terminal clusters subtended by slender leaves, invol. bracts linear-oblong obtuse scarious brown shining with a strong green central nerve half way down, achenes minutely papillose, pappus-hairs not coherent at the base. G. uliginosum, *Clarke Comp. Ind.* 115, *not of Linn.*

WESTERN HIMALAYA; Kashmir, alt. 5–7000 ft., *Thomson*, *Stewart*, *Brandis*.

A very distinct annual? species. *Stem* 4–6 in. *Leaves* 1–1½ in. *Heads* in pale globose clusters an inch in diameter, subtended by spreading leaves; flowers numerous.

7. **G. flaccidum,** *Kurz in Clarke Comp. Ind.* 115; *Journ. As. Soc.* 1877, ii. 182; sparingly cottony, stem simple or branching from the root erect flexuous, leaves obovate-spathulate flaccid, tips rounded, heads minute $\frac{1}{10}$ in. crowded into a terminal peduncled globose cluster subtended by leaves shorter than itself, invol. bracts hyaline outer broadly oblong or obovate obtuse, inner narrower yellow glistening.

BENGAL; Purwal, near Maldah, *Clarke*. PEGU, *Kurz*.

A flaccid green annual, 4–6 in. high. *Leaves* 1–2 in. long, very flaccid. Clusters of *heads* quite globose, 1–1½ in. diam. pale yellow. *Achenes* immature.

43. HELICHRYSUM, *Gærtn.*

Herbs or shrubs, often woolly or tomentose. *Leaves* alternate (the lower rarely opposite), quite entire. *Heads* solitary or corymbose, few or many fld., homogamous (or heterogamous with few outer ♀ fl.); flowers all fertile, or rarely the central sterile; ♀ filiform, minutely toothed; ☿ tubular, limb 4–5-toothed. *Involucre* of various forms; bracts ∞-seriate, scarious, appressed or loose, or with a spreading yellow red white or brown long or short scarious limb; receptacle various, naked or pitted or with the margins of the pits with bristles or pales. *Anther-bases* sagittate, tails simple or branched. *Style-arms* of ☿ truncate or subcapitate. *Achenes* small, terete, 5-angled or subcompressed; pappus-hairs 1- rarely ∞-seriate, free or connate below, dilated and bearded or feathery above.—DISTRIB. About 260, species chiefly of temperate and subtropical regions.

The Indian species are not distinguishable by habit from *Anaphalis*. *Gnaphalium macranthum*, Schultz-Bip. in Herb. Hohenack. n. 1023 and *G. chrysanthum*, Schultz-Bip. l.c. 1020 are both S. African *Helichrysa* and garden escapes. *Anaphalis Beddomei* may be a species of *Helichrysum*.

1. **H. buddleioides,** *DC. in Wight Contrib.* 20; *Prodr.* vi. 201; shrubby, stem robust leaves beneath and corymbs densely cottony, leaves large sessile elliptic-lanceolate acuminate 3–9-nerved, heads subcampanulate yellow in many globose corymbose clusters, invol. bracts oblong, inner with a short rounded scarious blade, achenes scabrid.

WESTERN PENINSULA; on the Ghats from Bombay to Cochin. CEYLON, alt. 7–8000 ft.

Stems 4–6 ft. high and branches as thick as a goose- or swan's-quill, tomentose, white grey or cinnamon-brown. *Leaves* 2–5 by ½–1½ in., nerves parallel, grooved above. *Corymbs* 4–8 in. diam., the globose clusters ½–1 in. diam.; heads campanu-

late, ⅙ in. diam. *Achenes* distinctly scabrid as figured by Wight (not glabrous as described both by DC. and Wight).

VAR. 1. *buddleioides* proper; leaves larger, nerves 5–9 very prominent beneath, heads yellow. H. buddleioides, *DC. l. c.*; *Wight Ic.* t. 1113; *Clarke Comp. Ind.* 116. Gnaphalium cynoglossoides, *Schultz-Bip. in Herb. Hohen.* n. 1043, *not of Trev.* G. sp., *Wall. Cat.* 2932.—Western Peninsula only.

VAR. 2. *Hookeriana*; smaller, leaves 1½–2½ in. 3–5-nerved more densely cottony beneath obscuring the nerves, heads paler. H. Hookerianum, *DC. Prodr.* vi. 201; *Clarke Comp. Ind.* 116. Gnaphalium Hookerianum *and* G. Wightianum *in part*, *Thwaites Enum.* 126.—Travancor, at Courtallam, *Wight.* Ceylon; central province, alt. 6–7000 ft., *Walker*, &c. I can find no specific character for this plant, the tomentum varies, as in the type from white to cinnamon brown.

2. **H. Wightii,** *Clarke mss.*; shrubby, branched, all parts with thick appressed wool, leaves sessile on the flowerless branches linear-lanceolate thick with 5–7 thick close-set parallel nerves tips recurved, those on the flowering branches smaller linear recurved, heads in subglobose corymbose clusters, invol. bracts oblong acute or subacute scarious.

NILGHERRY HILLS; Sisparah Ghat, *Wight.*

I have seen but one specimen in Wight's Herbarium, it differs from *H. buddleioides*, in the short leafy branches, the narrower leaves, woolly on both surfaces, the smaller heads and very different invol. bracts.

44. CÆSULIA, *Roxb.*

A glabrous marsh-herb. *Leaves* alternate, serrulate. *Heads* in sessile, axillary, involucrate balls, each sessile on a broad convex common receptacle, 1-fld.; fl. tubular, limb narrowly campanulate, deeply 5-fid. *Involucral bracts* 2, opposite, keeled or winged, and at length adnate to and including the achene. *Anther-bases* sagittate, tails branched. *Style-arms* short, linear-cuneate, subtruncate. *Achenes* included in the laterally compressed bracts; pappus 0.

C. axillaris, *Roxb. Hort. Beng.* 62; *Fl. Ind.* v. 482; *Cav. Ic.* i. 64, t. 93; *DC. in Wight Contrib.* 11; *Prodr.* v. 482; *Dalz. & Gibs. Bomb. Fl.* 126; *Wight Ic.* t. 1102; *Wall. Cat.* 3183; *Clarke Comp. Ind.* 116. Meyera orientalis, *Don Prodr.* 180.

Throughout NORTHERN INDIA; common in rice fields, ascending to 3000 ft., from the Punjab to Chittagong and the Deccan; (absent in Ceylon and the Eastern Peninsula).

Stems stout, prostrate or suberect, 6–12 in. *Leaves* 2–4 in., sessile, acuminate at both ends, nerves very numerous, base dilated subauricled. *Heads* ¾ in. diam. and under.

45. INULA, *Linn.*

Herbs, rarely shrubs. *Leaves* radical and alternate. *Heads* solitary, corymbose or panicled, heterogamous, radiate, rarely disciform; ray-fl. ♀, 1–∞-seriate, fertile, ligule long short or minute, yellow or white, 3-toothed; disk-fl. ☿, fertile, tubular, yellow, limb elongate 5-toothed. *Involucre* broad or rather narrow; bracts ∞-seriate, inner usually rigid and narrow, outer herbaceous, outermost often foliaceous; receptacle flat or tumid, pitted or areolate. *Anther-bases* sagittate, tails long simple or branched. *Style-arms* of ☿ linear, broader upwards, obtuse. *Achenes* subterete, usually ribbed; pappus hairs rather short, 1–2-seriate, few or many, smooth scabrid or bearded.—DISTRIB. Species about 56, European, African and Asiatic.

SECT. I. **Corvisartia.** Tall stout herbs. *Heads* large, solitary or race-

mose, broadly hemispheric; outer invol. bracts broad, herbaceous, outermost usually foliaceous.

1. **I. racemosa,** *Hook. f.*; stem and leaves above scabrid, leaves densely tomentose beneath crenate, radical long-petioled elliptic-lanceolate, cauline oblong ½-amplexicaul, heads very large 1½–2 in. diam. racemed, inner invol. bracts linear acute. I. Royleana, *Clarke Comp. Ind.* 118, *not of DC.* I. Helenium, *Herb. Ind. Or. H. f. & T., not of Linn.*

WESTERN HIMALAYA; on the borders of fields, &c.; Kashmir, alt. 5–7000 ft., *Falconer*, &c.; Piti, alt. 9–10,000 ft., *Thomson.*

A tall stout herb, 1–5 ft., stem grooved. *Leaves* coriaceous, radical 8–18 by 5–8 in., narrowed into a petiole as long; cauline often deeply lobed at the base. *Heads* many; outer invol. bracts broad, with recurved triangular tips; ligules slender, ½ in. *Achenes* ⅙ in., glabrous, slender; pappus ⅓ in., reddish.

2. **I. Royleana,** *DC. Prodr.* v. 464; stem and leaves above pubescent or villous and glandular, leaves denticulate woolly beneath, radical ovate or oblong with a long winged petiole, cauline lyrate base auricled, heads 3–4 in. diam. solitary, inner invol. bracts slender acuminate. I. Stoliczkai, *Clarke Comp. Ind.* 118. ? I. macrocephala, *Kotschy in Boiss. Flor. Orient.* iii. 186.

WESTERN HIMALAYA; Kashmir, alt. 7–11,000 ft., *Royle, Thomson, Aitchison*, &c.

A stout herb; stem 1–2 ft., grooved. *Leaves* rather membranous, obtuse, glabrate pubescent or villous above, sometimes thickly woolly beneath, radical 6–10 by 4–6 in. exclusive of the winged petiole, cauline variable. *Heads* very handsome, on a stout erect woolly or hirsute peduncle; invol. much broader than in *I. racemosa*, achenes similar; pappus-hairs paler. The root is, from its similarity to that of the Kut (*Saussurea Lappa*), used to adulterate that article (*Aitchison*).

SECT. II. **Bubonium.** Herbs. *Heads* small, corymbose or solitary, hemispheric, campanulate or turbinate; outer invol. bracts narrow, dry, rigid, or with herbaceous or squarrose tips, or outermost narrow and foliaceous.

* *Heads turbinate, terminating numerous slender branches. Achenes hairy, contracted into a small cup at the tip.*

3. **I. graveolens,** *Desfont. Fl. Atlant.* ii. 275; slender, much branched, pubescent and viscid, leaves small sessile linear acute 1-nerved quite entire, heads ⅓ in. diam. terminating slender axillary branchlets, invol. bracts few linear acute or acuminate erect, outer green pubescent and glandular, ligules very short, achenes hairy and viscid. *Boiss. Fl. Orient.* iii. 199; *Clarke Comp. Ind.* 120. Erigeron graveolens, *Linn.*; *Sibth. Fl. Græc.* t. 866. ? I. brahuica, *Boiss. Fl. Orient.* iii. 199.

N.W. INDIA; Peshawur, in waste ground, *Stewart.*—DISTRIB. Westwards to Spain.

Annual, 1–2 ft. high, stem and branches slender, often flexuous. *Leaves* 1–1½ by $\frac{1}{10}$–⅙ in., spreading, midrib strong beneath. *Heads* rather obconic. *Achenes* ¼ in. long, contracted at the apex with a cup-shaped tip; pappus-hairs rather coarse, inserted on the edge of the cup, but not united at the base.

** *Heads terminal, solitary or corymbose. Achenes silky or hairy.*

4. **I. macrosperma,** *Hook. f.*; stout, herbaceous, stem winged glabrous or pubescent, leaves amplexicaul decurrent oblong-ovate acuminate puberulous, heads 1½–2 in. diam. subcorymbose on stout erect peduncles, invol. bracts few lanceolate subacute pubescent, achenes very large narrowly obovate-oblong compressed strongly ribbed hispid above the middle much longer than the red stout scabrid pappus.

Alpine region of the SIKKIM HIMALAYA, *J. D. H.*

I have only a fragment of this remarkable species, the smooth soft stem is as thick as a goose-quill, smooth and shining, wings narrow membranous. *Leaves*, upper alone seen, 3–4 by 1 in. long. *Invol. bracts* herbaceous, $\frac{3}{8}$ in. long, spreading in fruit; receptacle hemispheric; ligules $\frac{1}{2}$ in., deeply 3-fid. *Achenes* $\frac{1}{4}$ in. long; pappus $\frac{1}{10}$ in.

5. **I. polygonata,** *DC. Prodr.* vi. 465; stem stout winged and leaves beneath and corymb very densely woolly, leaves sessile oblong or oblong-lanceolate obtuse denticulate, heads $\frac{1}{2}$ in. diam. in small corymbs immersed in thick wool, invol. bracts thick, outer oblong, inner narrow pungent, ray-fl. short tubular. *Clarke Comp. Ind.* 119. Conyza polygonata, *Wall. Cat.* 3010.

PEGU and BIRMA, on dry hills, *Wallich, Maclelland, Kurz.*

Stems 1–2 ft., simple or branched above, very robust, leafy. *Leaves* 3–4 by $\frac{3}{4}$–1$\frac{1}{4}$ in., very coriaceous, glabrous or rough above, sessile but not auricled at the base. *Heads* hemispheric; invol. bracts $\frac{1}{4}$ in., outer obtuse rigid, inner quite pungent. *Achenes* $\frac{1}{12}$ in., silky; pappus-hairs $\frac{1}{6}$ in., white, rather flattened.

6. **I. nervosa,** *Wall. Cat.* 2960; *DC. Prodr.* v. 471; perennial, pubescent hirsute or villous and glandular, stem simple or branched erect flexuous, leaves sessile or subsessile elliptic or elliptic-lanceolate acute at both ends subdentate scaberulous or scabrid above, nerves subparallel with the margin, heads $\frac{1}{2}$–1 in. solitary or corymbose peduncled, ligules white, invol. bracts linear-lanceolate acute hirsute erect or recurved, outermost foliaceous or not, achenes silky. *Clarke Comp. Ind. excl. syn. Roxb.* I. asperrima *and* nitida, *Edgew. in Journ. Linn. Soc.* xx. 68, 69. I. verrucosa, *Klatt in Sitzungb. Münch. Akad.* 1875, 86.

TEMPERATE HIMALAYA; alt. 4–7000 ft., from Garwhal to Bhotan. KHASIA MTS.; alt. 3–5000 ft., *Griffith*, &c.

Stem 1–3 ft., strict or flexuous. *Leaves* 2–4 by $\frac{3}{4}$–1$\frac{1}{2}$ in., usually membranous, teeth remote. *Heads* very variable in size, and especially in the invol. bracts, which are green and either appressed or squarrose, the outermost are narrow recurved and usually leafy; ligules rather broad, shorter than the breadth of the head. *Achenes* $\frac{1}{16}$ in.; pappus dirty-white.

VAR. *purpurascens*; invol. bracts narrow linear-lanceolate finely acuminate straight purple glabrescent.—Khasia Mts., *Lobb, Clarke.* The bracts differ much from the Khasian specimens gathered by Griffith, or from the Himalayan, but they are always very variable in this species and its allies.

7. **I. Simonsii,** *Clarke Comp. Ind.* 121; hirsute with yellow glandular hairs, leaves subsessile oblong acute base rounded denticulate rigid hirsute on both surfaces, heads long-peduncled, invol. bracts lanceolate outer shorter hirsute, ligules long white, achenes narrowly oblong silky, pappus white.

ASSAM (Bhotan?), *Dr. Simons.* BHOTAN, *Nuttall.*

I have seen no specimens of this species, which its author describes as being very near *I. nervosa*, but differing in the larger heads and leaves rounded at the base.

8. **I. obtusifolia,** *Kerner Nov. Sp. Pl. Jaeschke,* 18; stems many from a woody stock short erect rigid and leaves beneath scabrid or hairy, leaves sessile oblong or ovate-oblong obtuse or acute base rounded, heads 1 or few $\frac{1}{2}$–1$\frac{1}{2}$ in. diam., inner invol. bracts linear or linear-lanceolate acute rigid pubescent outermost leafy, achenes slender silky. I. oculus Christi, var. *and* I. Thomsoni, *Clarke Comp. Ind.* 120.

WESTERN TIBET and KUMAON; alt. 10–14000 ft., *Thomson, Jaeschke.*—DISTRIB. Kashgar.

Stems 6–12 in., often rigidly flexuous, leafy to the top. *Leaves* 1$\frac{1}{2}$–2 in., rigid, often scaberulous above, obscurely denticulate, nerves reticulated beneath. *Heads* very variable in size, hemispheric, outer leafy; invol. bracts 1–2, small or large, inner

erect, acuminate; ligules shorter than the diam. of the head. *Achenes* $\frac{1}{10}$ in.; pappus pale reddish.

VAR. *Clarkei*; stems and leaves beneath shortly tomentose, heads larger, invol. bracts more villous greener very pubescent, outer larger longer more herbaceous.—Mustag Pass, Kashmir, 11,500 ft., *Clarke*; Lahul, *Jaeschke*. This may be a different species, but I think it is only a very luxuriant state of *I. obtusifolia*.

*** *Heads terminal, solitary or corymbose; achenes nearly glabrous.*

9. **I. Hookeri,** *Clarke Comp. Ind.* 122: perennial, stem simple or branched villous above, leaves sessile or sub-petioled elliptic-lanceolate acute at both ends gland-toothed membranous hairy on both surfaces, heads 1½–2 in. diam. solitary or 2–3, invol. hemispheric villous, bracts all very slender squarrosely recurved, achenes very small glabrous. *Bot. Mag.* t. 6411.

SIKKIM HIMALAYA; alt. 7–10,000 ft., *J. D. H.*

Stem 1–2 ft., usually very shaggy above, but sometimes glabrescent. *Leaves* 3–5 by 1–1½ in., lower narrowed almost into a petiole, upper sessile, base auricled; nerves slender, diverging. *Heads* very broad, shaggy with very long hairs; invol. bracts ¾–1 in., almost filiform; ligules many, slender, as long as the disk is broad. *Achenes* $\frac{1}{14}$ in., angled; pappus ⅙ in., dirty-white.

10. **I. grandiflora,** *Willd.*; *Boiss. Fl. Or.* iii. 186; perennial, stem simple hirsute or hairy above leafy throughout, leaves sessile oblong or elliptic-lanceolate acuminate gland-serrate glabrescent or sparingly hairy and ciliate, outermost often foliaceous, achenes very small nearly glabrous.

WESTERN HIMALAYA; from Kashmir, alt. 6–7000 ft., to Kumaon and Nipal, alt. 8–12,000 ft.—DISTRIB. Westwards to the Caucasus.

A shorter stouter species than *I. Hookeri*, and with shorter leaves broader at the base, and more oblique nerves and single heads. *Involucre* not shaggy in the Himalayan examples (as they are in the Caucasian); bracts pubescent, rather rigid; ligules longer than the disk is broad. *Achenes* with a very few short hairs or 0, and pappus as in *I. Hookeri*.—Clarke states that his was found by Stoliczka at 14–17,000 ft. elevation.

11. **I. acuminata,** *DC. Prodr.* v. 471; annual, stem strict glabrous or pubescent above, leaves small suberect elongate hastate acuminate from a dilated sessile cordate base obscurely toothed glabrous, heads ½–¾ in. diam. few subcorymbose, invol. bracts narrow linear acuminate erect green puberulous, achenes minute nearly glabrous. I. salicina, *Clarke Comp. Ind.* 132, *not of Linn.*

WESTERN HIMALAYA, *Royle, Falconer*; Kashmir, *Stoliczka*; on calcareous rocks, alt. 8000 ft., *Clarke*.

Usually quite glabrous, with the habit and foliage of a *Lactuca*. *Stem* shining, 10–14 in., sometimes branched. *Leaves* 1–4 in., gradually tapering from the broad base to the very acuminate point; ligules short, recurved. *Achenes* $\frac{1}{24}$ in. long, with a few short, erect hairs; pappus ⅙ in., pale reddish.

12. **I. Falconeri,** *Hook. f.*; annual, glabrous, sparsely hairy or tomentose, stem corymbosely branched rarely simple, lower leaves long linear or oblong or linear-oblong gradually contracted above the amplexicaul auricled base, cauline oblong, heads ½–⅔ in. diam. corymbose, invol. bracts linear acute pubescent or tomentose erect or recurved green, achenes minute sparsely pubescent.

WESTERN TIBET, *Falconer*; Iskardo, alt. 7–8000 ft., *Clarke*.

A very variable weedy annual; stems slender, glabrous simple and 12–18 in. high, or stout branched and tomentose. *Leaves*, lower sometimes 3 by ¼ in. and contracted below, at others ½–1 in. oblong with auricled bases, nerves very obscure. *Achenes* and pappus as in *I. acuminata*.

13. **I. Kalapani,** *Clarke Comp Ind.* 123; pubescent or hirsute, stem simple or sparingly forked, radical leaves petioled elliptic-ovate or lanceolate obtuse or acute subdentate, cauline oblong or ovate-oblong from an amplexicaul dilated base, heads $\frac{2}{3}$–1 in. diam. few corymbose, invol. bracts few linear acute hirsute green, achenes minute glabrous.

KHASIA MTS.; Kalapani river, alt. 4–5000 ft., *J D. H. & T. T.*, *Clarke.*

Habit of an *Aster*, 12–18 in. high. *Leaves*, radical 2–3 in. long, narrowed into the petiole, cauline 1–1$\frac{1}{2}$ in., erect or spreading. *Invol. bracts* spreading or recurved, outer subfoliaceous; ligules short, about $\frac{1}{3}$ in. *Achenes* $\frac{1}{20}$ in. long; pappus scanty, very short, $\frac{1}{8}$ in., reddish.

SECT. III. **Ægopthalmus.** Stemless. *Heads* sessile amongst the rosulate leaves.

14. **I. rhizocephaloides,** *Clarke Comp. Ind.* 124; leaves all radical rosulate obovate-spathulate obtuse ciliate, heads $\frac{2}{3}$–1 in. diam. crowded sessile, invol. bracts linear acute erect or tips recurved, achenes glabrous ribbed.

WESTERN TIBET, *Falconer*; Dras, alt. 7–9000 ft., *Thomson*; Ladak, alt. 12–14,000 ft., *Stoliczka.*

Whole plant 2–5 in. diam. *Leaves* horizontal, appressed to the ground, narrowed into a broad petiole. *Invol. bracts* all similar; ray-fls. very few with minute ligules or tubular or 0. *Achenes* $\frac{1}{15}$ in.; pappus $\frac{1}{3}$ in., red.—This resembles closely the *I. rhizocephala*, Schrank, but the invol. bracts are narrower, less rigid, and purple, and the rays are very different.

SECT. IV. **Cappa.** Shrubs. *Heads* small, corymbose or racemose; invol. bracts linear or subulate, outer gradually smaller.

15. **I. Cappa,** *DC. Prodr.* v. 469; shrubby, branches leaves beneath and corymbs densely silkily villous or woolly, leaves sessile or shortly petioled oblong or oblong-lanceolate acute toothed pubescent or glabrescent above, heads very many $\frac{1}{3}$ in diam., invol. bracts linear rigid acuminate pubescent, achenes silky. *Clarke Comp. Ind.* 124. I. Pseudo-cappa *and* eriophora, *DC. l. c.* 469, 470. I. salviodora, *Schultz-Bip. in Miq. Fl. Ind. Bat.* ii. 62. Conyza lanuginosa, eriophora *and* argentea, *Wall. Cat.* 2922, 3013, 3014. C. Cappa, *Ham. in Don Prodr.* 176. Duhaldea chinensis, *DC. l. c.* 366.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 4–6000 ft. (ascending to 10,000 in Kumaon, *Str. & Wint.*). KHASIA MTS., alt. 4–5000 ft. PEGU and BIRMA. —DISTRIB. Java, China.

Shrub 4–8 ft. high; branches very stout. *Leaves* 3–6 by 1–2$\frac{1}{2}$ in., coriaceous, acute or obtuse, base rounded or acute (in Sikkim leaves 9 by 2$\frac{1}{2}$ in., gradually acuminate at both ends), toothing variable. *Heads* very numerous; invol. bracts very variable in length, number and breadth, always narrow and linear or subulate; ligules few, very short or 0. *Achenes* $\frac{1}{20}$ in.; pappus $\frac{1}{6}$ in., dirty-white, hairs thickened at the ends.

16. **I. eupatorioides,** *DC. Prodr.* v. 469; shrubby, branches stout and leaves beneath and corymbs pubescent or subtomentose, leaves shortly petioled elliptic-oblong or lanceolate acuminate coriaceous irregularly toothed scaberulous above, heads numerous $\frac{1}{3}$ in. diam. in terminal corymbs shortly peduncled, invol. bracts subulate tomentose, achenes silky. *Clarke Comp. Ind.* 125. Conyza eupatorioides, *Wall. Cat.* 2993. Amphiraphis heterotricha, *DC. l. c.* 343. Conyza *and* Solidago heterotricha, *Wall. Cat.* 3225.

EASTERN HIMALAYA; Sikkim, *J. D. H.* Bhotan, *Griffith.* KHASIA MTS., alt. 4–6000 ft. BIRMA, *Griffith.* MOULMEIN, *Lobb.*

Very closely allied to *I. cuspidata*, but differing in the much stouter habit, shorter stouter-petioled more rigid leaves with much-reticulated nervation beneath, narrower

ligules; achenes and pappus the same.—The Moulmein specimen has very short elliptic leaves 3 by 1½ in., coriaceous, and scabrid above.

17. **I. cuspidata,** *Clarke Comp. Ind.* 125; shrubby, branches glabrous or young pubescent, leaves petioled elliptic-lanceolate acuminate serrulate membranous glabrous or scaberulous above, heads numerous in terminal corymbs ⅓ in. diam. on slender peduncles, invol. bracts linear acute pale rigid, outer subulate, achenes silky. I. polycephala, *Klatt in Sitzungb. Münch. Akad.* 1878, 85. Amphiraphis cuspidata, *DC. Prodr.* v. 343. Solidago cuspidata, *Wall. Cat.* 3244.

Western Himalaya; from Kashmir to Kumaon, alt. 4–7000 ft.

A nearly glabrous shrub, with rather slender branches. *Leaves* 3–5 in., always acute at both ends, young softly pubescent; petiole slender; ligules broad revolute. *Achenes* $\frac{1}{16}$ in.; pappus ⅙ in., yellowish, hairs thickened at the tip.—A Simla specimen from Major Madden has the leaves finely tomentose beneath.

Sect. V. **Limbarda.** *Heads* panicled or racemed (solitary in *I. grantioides*).

18. **I. rubricaulis,** *Clarke Comp. Ind.* 126; shrubby, branches and leaves glabrous, leaves sessile elliptic-lanceolate acuminate serrate membranous, heads ⅔ in. diam. 3–5 together in very short axillary racemes with tomentose peduncles and slender pedicels, invol. bracts subulate-lanceolate acuminate or aristate straight, achenes silky. Amphiraphis rubricaulis, *DC. Prodr.* v. 343. Solidago rubricaulis, *Wall. Cat.* 3223.

Subtropical Himalaya; alt. 3–6000 ft., from Kumaon to Sikkim.

Shrub 3–6 ft.; branches long, slender, flexuous. *Leaves* 4–6 by 1–1½ in., nerves almost parallel with the margin. *Corymbs* not ¼ the length of the leaves, sometimes racemed towards the ends of the branches; invol. bracts green or purplish; ligules short, broad, revolute. *Achenes* ⅛ in., slender; pappus ¼ in., white, hairs not thickened at the tip.

19. **I. Griffithii,** *Clarke Comp. Ind.* 126; shrubby, branches woody and leaves scabrid on both surfaces, leaves very large sessile obliquely oblanceolate acuminate denticulate, heads ⅓ in. diam. few in a small terminal spreading slender sessile pubescent panicle half the length of the leaves, invol. bracts few linear with a subulate point straight rigid, achenes glabrous.

Bhotan; rocks near Dairang, *Griffith.*

Branches as thick as a goose-quill. *Leaves* 1 foot., membranous, curved, abruptly acuminate, narrowed to the very base, green, nerves slender spreading. *Panicle* as broad as long, compound, with curved lanceolate leafy bracts at the axils; peduncles very slender; ligules 0?; anther-tails very long, lacerate. *Achenes* unripe, $\frac{1}{20}$ in.; pappus ⅘ in., hairs thickened a little at the tips.

20. **I. grantioides,** *Boiss. Fl. Orient.* iii. 195; shrubby, papillose glandular and hairy, branches very stout short, leaves fleshy lower long-petioled cuneate 3-fid. upper linear entire or 3-toothed, heads 1 in. diam. solitary, invol. bracts pubescent and viscid, outer short green obtuse, inner narrower long acute, achenes large strongly ribbed hispid above constricted below the tip. I. cutchica, *Clarke Comp. Ind.* 126.

Scind; at Kutch, Kurachee, &c. Wuzuristan, *Stewart.*

A low, stout, woody shrub, with fleshy leaves and a balsamic odour. *Leaves* 1–2 in. long, lobing variable. *Ligules* few, short, yellow; lobes of disk-fl. very acuminate. *Achenes* $\frac{1}{10}$ in., narrowly oblong, ribbed as in *I. macrosperma*; pappus twice as long, reddish, scabrid.—Bentham (Gen. Pl. ii. 322) refers this to *Grantia Aucheri*, Boiss., to which it bears a most deceptive similarity, differing almost solely in the pappus-hairs being filiform to the base; it invalidates the genus *Grantia*. Stock's specimens were not gathered in Beluchistan as Boissier supposed.

46. **VICOA,** *Cass.*

Annual or perennial, glabrous or hairy herbs. *Leaves* alternate, entire or toothed, upper amplexicaul. *Heads* terminal, solitary or on leaf-opposed peduncles, woolly, radiate and heterogamous or disciform and homogamous; ray fl. ♀, 1–2-seriate, fertile, ligule narrow, 2–3-toothed; disk-fl. ☿, fertile, slender, limb hardly dilated 5-toothed. *Involucre* campanulate; bracts ∞-seriate, narrow, inner scarious, outer shorter margins scarious; receptacle flat or subconvex, naked. *Anther-bases* sagittate, tails slender. *Style-arms* of ☿ flattened, broader upwards, obtuse or truncate. *Achenes* small, hardly ribbed, tip rounded. *Pappus-hairs* 5-∞, 1-seriate, smooth scabrid or bearded.—DISTRIB. Species 6; Tropical and Western Asia and Africa.

This genus had best be united to *Inula.*

1. **V. auriculata,** *Cass.*; *DC. Prodr.* v. 474; annual, slender, pubescent and viscid or glabrate, leaves sessile lanceolate or oblong-lanceolate from a broad auricled base acuminate entire or serrulate often scabrid above, invol. bracts scarcely recurved, V. indica, *DC. in Wight Contrib.* 10; *Prodr. l. c.*; *Wight Ic.* t. 1148; *Clarke Comp. Ind.* 127; *Dalz. & Gibs. Bomb. Fl.* 126. V. aurita, *DC. l. c.* 474. V. appendiculata, *DC. l. c.*; *Clarke l. c.* Inula indica, *Linn.*; *Burm. Fl. Zeyl.* 124, t. 55, f. 2; *Wall. Cat.* 2964. I. auriculata *and* appendiculata, *Wall. Cat.* 2965, 2966. Doronicum calcaratum, *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 434.

Throughout the drier parts of INDIA, from the Punjab to Birma and southwards, ascending the Western Himalaya to 4000 ft. and to 5000 in CEYLON (not found in the Eastern Peninsula).

A usually much branched slender rigid leafy herb, 1–3 ft., with spreading branches. *Leaves* in largest specimens 7 by $1\frac{1}{4}$ in., more commonly 1–2 in.; base always rounded; auricles rounded or hastate, sometimes gashed. *Heads* $\frac{1}{4}$–$\frac{3}{4}$ in., on long slender spreading peduncles; invol. bracts very slender; ligules revolute, as long as the involucre. *Achenes* $\frac{1}{30}$ in., pale, terete, sparsely hairy; pappus hairs few, slender, free at the base.

2. **V. cernua,** *Dalz. in Dalz. & Gibs. Bomb. Fl.* 126; annual, slender, sparsely pubescent, lower leaves shortly petioled elliptic acuminate serrate, upper sessile contracted to a small auricled base, invol. bracts squarrose tips filiform recurved.

Hills of the CONCAN and WESTERN DECCAN; Belgaum, &c, *Law, Stocks,* &c.

Very similar in habit to *V. auriculata*, but differing in the leaves and invol. bracts. The achenes and pappus are very much alike, and I do not find the difference in the pappus of the ray flowers which Dalzell describes.

3. **V. vestita,** *Benth. in Gen. Pl.* ii. 335; woolly and softly hairy, leaves oblong or linear-oblong obtuse or subacute from a broad auricled base serrate, invol. bracts squarrose tips filiform recurved, achenes subsilky. Inula vestita, *Wall. Cat.* 2962; *DC. Prodr.* v. 470; *Boiss. Fl. Orient.* iii. 199; *Clarke Comp. Ind.* 119. Pentanema radiatum, *Boiss. Diagn.* ser. 2. iii. 14.

Drier parts of India from MARRI, *Fleming*, and the PUNJAB, to SCIND, PATNA, BEHAR, and the CONCAN; SIKKIM, *Treutler*; WESTERN TIBET, at Iskardo, *Thomson.*—DISTRIB. Affghanistan.

A shorter stouter plant than the two preceding species, with more numerous narrower ligules, but similar achenes and pappus.

47. **PULICARIA,** *Gaertn.*

Annual or perennial, usually woolly or villous herbs. *Leaves* alternate, sessile, often amplexicaul. *Heads* solitary, radiate and heterogamous, or disci-

form and homogamous, yellow; ray fl. ♀, 1–2-seriate, ligules narrow, or minute or 0; disk fl. ☿, fertile, slender; limb elongate, shortly 5-fid. *Involucre* hemispheric or obconic; bracts in few series, narrow, acuminate or awned; receptacle flat or subconvex, pitted. *Anther-bases* sagittate; tails capillary, simple or branched. *Style-arms* of ♀ linear, obtuse. *Achenes* terete or ribbed; pappus double, outer of short jagged teeth, inner of smooth scabrid or bearded filiform or flattened hairs.—DISTRIB. Species about 24, European, Asiatic, and African.

SECT. I. **Eupulicaria.** *Invol. bracts* slender. *Pappus* double; outer of a crown of short scales, inner of slender hairs.

1. **P. vulgaris,** *Gaertn.*; *Boiss. Fl. Orient.* iii. 204; annual, pubescent or softly tomentose, leaves sessile oblong-lanceolate from a ½-amplexicaul base, lower petioled, heads on short stout peduncles, invol. bracts subulate, ligules erect very short, pappus dirty white twice as long as the silky achenes, outer scales lanceolate serrate free. *DC. Prodr.* v. 478; *Clarke Comp. Ind.* 128. Inula Pulicaria, *Linn.*

KASHMIR, alt. 5–6000 ft., *Falconer, Thomson*; Peshawur, *Jacquemont, Stewart.*—DISTRIB. Central and N. Asia, Persia, and westwards to Algeria and Britain.

Erect, 6–18 in. high, copiously dichotomously subcorymbosely branched above. *Leaves* ½–1 in. *Heads* ⅓–½ in. diam.; peduncles divaricate; invol. bracts very woolly in the Kashmir plant, erect or with subrecurved tips; ligules hardly exceeding the bracts. *Achenes* very minute; pappus $\frac{1}{10}$ in. long.

2. **P. dysinterica,** *Gaertn.*; *Boiss. Fl. Orient.* iii. 201; perennial, woolly or cottony, leaves ½-amplexicaul oblong-cordate waved and toothed, heads densely woolly, invol. bracts setaceous, ligules many long, pappus dirty white four or five times as long as the silky achenes, outer scales lanceolate free. Inula dysinterica, *Linn.*

KASHMIR, alt. 5–6000 ft., *Falconer, Thomson.*—DISTRIB. Westwards to Algeria and Britain.

A more robust plant than *P. vulgaris*, with ligules much exceeding the invol. bracts, and much longer and more copious pappus.

3. **P. foliolosa,** *DC. Prodr.* v. 480; annual, pubescent or tomentose above, leaves sessile linear-oblong or -oblanceolate from a broad or contracted ½-amplexicaul base quite entire, tips apiculate recurved, heads woolly and glandular, invol. bracts almost setaceous, peduncles very slender, ligules 0, pappus hairs very few white twice as long as the minute hairy achenes, scales connate below. *Clarke Comp. Ind.* 128. Blumea senecionidea, *Edgew. Fl. Banda*, 16. Conyza foliolosa, *Ham. in Wall. Cat.* 3281.

Upper and Lower GANGETIC PLAINS; Oude, Sikkim, Terai, Maldah, and banks of the Ganges. CENTRAL INDIA; Saugur and Jubbulpore. BANDA, *Edgeworth*. The CONCAN, *Law*, &c.

Stem 1–2 ft., copiously branched. *Leaves* 1–6 in., lower dilated from the base upwards, almost glabrous. *Heads* scattered, smaller than in *P. vulgaris* or *dysinterica*; ray fl. tubular, 3-toothed.

SECT. II. **Poloa.** *Invol. bracts* herbaceous or leafy. *Pappus* of sect. *Eupulicaria.*

4. **P. Wightiana,** *Clarke Comp. Ind.* 118; annual, puberulous above, leaves sessile linear-oblong from a sub-auricled base obtuse entire or serrulate, heads solitary, peduncles stout strict, invol. bracts herbaceous lanceolate acute, ligules equalling the bracts, pappus at length reddish twice as long as the glabrate achenes, outer scales united in a cup. P. hyderabadensis, *DC. l. c.* 480.

Callistephus Wightianus, *DC. l. c.* 275; *Wight Ic.* t. 1089; *Dalz. & Gibs. Bomb. Fl.* 123. C. Heyneanus, *DC. l. c.* Poloa Wightiana, *DC. in Wight Contrib.* 10. Erigeron Wightianus, *Wall. Cat.* 3284. Aster indicus, *Heyne*; and A. hyderabadensis, *Wall. Cat.* 2971, 2972.

Hilly country of the DECCAN and MAISOR, common from the Concan southwards.

A tall, stout, much branched, leafy herb, 12–18 in. high; branches often angled, erect. *Leaves* 1–2 in., erect. *Heads* ½–¾ in. diam., peduncles swollen upwards. *Achenes* 1/16 in., brown, shining, as are the highly coloured pappus hairs.

5. **P. angustifolia,** *DC. Prodr.* v. 479; annual, softly pubescent, branches erect or ascending, leaves sessile linear-oblong or obovate, base narrow entire or serrulate, tips obtuse or apiculate and recurved, heads small, invol. bracts herbaceous lanceolate acuminate, ligules equalling or exceeding the bracts, pappus white or reddish twice as long as the glabrate achenes, outer scales laciniate. *Clarke Comp. Ind.* 129. P. indica, *Jaub. & Spach. Ill. Pl. Orient.* t. 343. P. Stocksii, *Boiss. Fl. Orient.* iii. 206. P. saxicola, *Edgew. in Journ. Linn. Soc.* ix. 323. Callistephus concolor, *Dalz. in Hook. Journ. Bot.* ii. 344; *Dalz. & Gibs. Bomb. Fl.* 123.

NORTH-WESTERN INDIA, *Royle*: Delhi, *Jacquemont*. BANDA, *Edgeworth*. SCIND, *Stocks*. The CONCAN, *Law*, &c.—DISTRIB. Beluchistan.

A very variable annual, with sometimes a woody stock, much smaller than *P. Wightiana*, with shorter leaves, narrower at the base, more slender peduncles, and smaller heads. The ligules are very deciduous, if indeed they are always present, which is perhaps doubtful.

SECT. III. **Francœuria.** *Invol. bracts* slender or subherbaceous. *Pappus hairs* bearded, thickened at the tips; outer scales connate with the hairs and deciduous with them.

6. **P. crispa,** *Benth. in Gen. Pl.* ii. 336; perennial, shrubby below, branches and leaves beneath densely cottony, leaves sessile linear-oblong or subspathulate, margins recurved toothed and crisped lower ½-amplexicaul, involucre pubescent, bracts very slender setaceous, ligules shorter than the bracts, pappus white three times as long as the glabrate achenes. *Clarke Comp. Ind.* 129. Francœuria crispa, *Cass.*; *DC. Prodr.* v. 475; *Boiss. Fl. Orient.* iii. 206. Inula quadrifida, *Ham. in Wall. Cat.* 2963. Duchesnia crispa, *Cass. in Dict. Sc. Nat.* xiii. 546.

The PUNJAB, *Royle*, &c. UPPER GANGETIC PLAIN and eastwards to BEHAR.—DISTRIB. Westwards to Arabia, Africa, the Canary and Cape de Verd Islands.

Stout, shrubby, 1–2 ft. high, very leafy; branches ascending. *Leaves* ½–1½ in., lowest in young plants sometimes 4 in., obovate-spathulate, with flat margins; upper very small. *Heads* ¼–⅓ in. diam. (ligules sometimes 0, *Boissier*).

7. **P. gnaphalodes,** *Boiss. Fl. Orient.* iii. 203; annual, softly woolly below, leaves sessile obovate-spathulate obtuse waved and crisped, heads very small, invol. bracts few pubescent short oblong-lanceolate, ligules few very short, pappus white or reddish hairs twice as long as the silky achenes. Inula gnaphalodes, *Vent. Hort. Cels.* t. 75. Strabonia gnaphalodes, *DC. Prodr.* v. 481.

WESTERN TIBET; Iskardo, *Thomson*.—DISTRIB. Affghanistan, Persia.

Habit of *P. crispa*, but not cottony, usually more slender, with larger heads and very different involucre. Thomson's specimens are very old, and have neither flowers nor achenes; but I do not doubt their belonging to this species.

SECT. IV. **Platychæte.** *Invol. bracts* elliptic or linear-lanceolate, acute. *Pappus* double; outer a short jagged crown, inner of flattened shining rigid

scabrid hairs. *Achenes* short, terete, pericarp crustaceous.—A very distinct group in respect of both pappus and achenes.

8. **P. glaucescens,** *Jaub. & Spach. Ill. Pl. Orient.* t. 349; dwarf, shrubby, glabrous or sparsely hairy above, leaves fleshy elongate linear or dilated upwards, margins flat or involute quite entire, heads ⅓ in. diam. shortly peduncled, invol. bracts glabrous lanceolate acute rigid, ligules 0, pappus white or yellowish much longer than the short oblong silky achenes. *Clarke Comp. Ind.* 130. Platychæte glaucescens, *Boiss.*; *Fl. Orient.* iii. 209.

The PUNJAB, SALT RANGE and MARRI, *Fleming.* WUZURISTAN, *Stewart.*—DISTRIB. Beluchistan, Persia.

A small saline succulent-leaved shrub, with pale woody stem and branches. *Leaves* 1–2½ in., tips usually recurved. *Heads* shining from the copious pale straw-coloured pappus. The outer pappus is continuous with the pubescence of the very short achenes.

9. **P. Boissieri,** *Hook. f.*; dwarf, shrubby, villous with long white hairs, leaves fleshy spathulate or elongate-spathulate quite entire or sparsely toothed flat or complicate, heads ½ in. diam. shortly peduncled, invol. bracts lanceolate acute rigid puberulous, ligules 0, pappus white or yellowish much longer than the short oblong silky achenes. Platychæte villosa, *Boiss.*; *Fl. Orient.* iii. 208.

SCIND, *Stocks.*

Habit and heads of *P. glaucescens*, but softly villous, and the leaves are not more than ½–1 in. long. Boissier describes the invol. bracts as very obtuse, but they are quite acute in our specimens.

10. **P. Stocksii,** *Hook. f.*; dwarf, shrubby, pubescent, leaves short spathulate very fleshy quite entire flat or concave above, heads subsessile ¼ in. diam., invol. bracts rigid lanceolate puberulous outer obtuse inner acute, ligules 0, pappus white much longer than the short oblong silky achenes.

SCIND, *Stocks.*

A much shorter and more robust plant than *P. Boissieri* or *glaucescens*, blackish when dry, with leaves ¼–½ in. long, not recurved at the tips.

DOUBTFUL SPECIES.

P. SAKKIANA, *Klatt. Compos. Schlagintw.* 87. The description of this answers to any of the above described species of *Platychæte.*

48. CARPESIUM, *Linn.*

Erect branched herbs. *Leaves* alternate. *Heads* terminal or axillary, sessile or peduncled, usually drooping, heterogamous, disciform, yellow; outer fl. ♀, ∞-seriate, fertile, slender, 3–5-toothed; disk-fl. ☿, fertile, slender, limb slightly dilated 5-toothed. *Involucre* hemispheric or subglobose; bracts in few series, inner broad obtuse dry, outer with herbaceous or foliaceous tips; receptacle flat, naked. *Anther-bases* sagittate, tails slender. *Style-arms* linear, obtuse, connivent till late. *Achenes* elongate, striate with an (often glandular) beak surmounted by a corona; pappus 0.—DISTRIB. Species 4–5, S. European and temperate and subtropical Asiatic.

1. **C. cernuum,** *Linn.*; pubescent, leaves shortly petioled elliptic-lanceolate obtuse sinuate-toothed, heads terminal drooping with broad leafy bracts, outer invol. bracts leafy spreading. *Clarke Comp. Ind.* 130.

TEMPERATE HIMALAYA and the KHASIA and NILGHERRY MTS.—DISTRIB. From the Caucasus to France, Java, Japan.

One of the commonest and most variable Himalayan plants, and often a pest to the traveller from the glandular achenes adhering to the clothes; it grows 1–3 ft. high. The following often very distinct-looking varieties graduate into one another in the most perplexing way, and render it very doubtful if *C. trachelioides* should be kept distinct.

VAR. 1. *cernuum proper*; stem and branches pubescent often more or less cottony, leaves subsessile elliptic, heads $\frac{1}{3}$–$\frac{1}{2}$ in. rarely 1 in. diam. with large leafy bracts at the base. C. cernuum, *DC. Prodr.* vi. 281; *Boiss. Fl. Orient.* iii. 214; *Lamk. Ill.* t. 696, f. 1. C. nepalense, *Less. in Linnæa*, vi. 234; *DC. l. c.* C. pubescens, *Wall. Cat.* 3199; *DC. l. c.*—Himalaya and Khasia Mts.

VAR. 2. *glandulosa*, Herb Ind. Or. H. f. & T.; Clarke Comp. Ind. 130; usually hirsute or villous, lower and often cauline leaves also long petioled and ovate or cordate, heads as in var. 1.—Himalaya and Khasia Mts., ascending to 13,000 ft. in Sikkim.—There is every gradation between specimens with long petioled cordate-ovate leaves and those of var. 1.

VAR. 3. *nilagiricum*, Clarke Comp. Ind. 131; hirsute or villous, leaves subsessile elliptic or ovate-lanceolate, heads $\frac{1}{3}$–1 in. diam., involucre villous. C. nepalense, *Wight Ic.* t. 1120. Oiospermum? Wightianum, *DC. Prodr.* vi. 11; *Deless. Ic. Sel.* iv. t. 1.—Nilgherry Mts., alt. 7–8000 ft.

VAR. 4. *lanata*, Herb. Ind. Or. H. f. & T.; robust, stem branches and leaves densely woolly or cottony with white hairs, heads 1 in. diam., involucre villous. *Clarke Comp. Ind.* 1304, *excl. syn.*—Sikkim, alt. 4–5000 ft.; Khasia Mts.

VAR. 5. *pedunculosa*, Clarke l. c.; glabrous or sparsely hairy, leaves large ovate with winged petioles, heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. on very long stiff naked peduncles, invol. bracts glabrate. C. pedunculosum, *Wall. Cat.* 3200; *DC. Prodr.* vi. 281.—Kumaon, *Blinkworth*; Simla, alt. 6–8000 ft., *Thomson.*

VAR. 6. *ciliatum*; stem and branches very slender pubescent, leaves very small $\frac{3}{4}$–1 in. shortly petioled elliptic-ovate or lanceolate sparsely hairy above pubescent beneath, heads $\frac{1}{2}$ in. diam. C. ciliatum, *Wall. Cat.* 3214.—Travancore, *Herb. Rottl.*

VAR. 7. *Griffithii*; stem and branches tomentose, leaves petioled linear 2 by $\frac{1}{3}$ in. quite entire hirsute on both surfaces, heads $\frac{1}{4}$ in. with narrow subtending leaves, invol. bracts few inner glabrous.—Mishmi hills, *Griffith* (a fragment only).

2. **C. trachelifolium,** *Less. in Linnæa*, vi. 233; slender, pubescent hirsute or glabrate, lower leaves long-petioled ovate-cordate sinuate-toothed or lobulate, upper floral subsessile ovate or elliptic-lanceolate serrate or entire, heads very small $\frac{1}{6}$–$\frac{1}{4}$ in. rarely more sometimes subracemose, invol. bracts very few glabrous. *DC. Prodr.* vi. 282. C. cernuum, var. trachelifolium, *Clarke Comp. Ind.* 131.

TEMPERATE HIMALAYA; from Kashmir, alt. 5–7000 ft., to Sikkim, alt. 7–10,000 ft.

This has the leaves of *C. cernuum*, var. *glandulosum*, but has very small heads, and is in its common state different in habit, sometimes approaching *C. abrotanoides.* It holds its characters so much more constantly than do any of the varieties of *cernuum*, and covers so great an area, that I keep it distinct.

3. **C. abrotanoides,** *Linn.*; *Boiss. Fl. Orient.* iii. 215; branches long slender, leaves subsessile lanceolate acuminate quite entire or serrate, heads $\frac{1}{4}$ in. diam. subsessile racemosely secund along the leafy branches horizontal or nodding, invol. bracts broadly oblong obtuse. *DC. Prodr.* vi. 282; *Lamk. Ill.* t. 696; *Clarke Comp. Ind.* 131. C. racemosum, *Wall. Cat.* 3201, *in part*; *DC. l. c.* Amphiraphis Wightiana, *Wall. Cat.* 2958. Compos., *Wall. Cat.* 7522.

TEMPERATE HIMALAYA; from Kashmir, alt. 5–10,000 ft., to Sikkim, alt. 8–10,000 ft.—DISTRIB. N. Persia, to Austria. Japan, and China.

A stout herb, 2–4 ft. high, pubescent or glabrate; branches leafy to the tips. *Leaves* 3–5 in., never truly petioled. *Heads* inserted along the whole length of the branches, in or above the leafy axils, or in short axillary racemes, yellow.—Used to dye silk in Kashmir (*Stewart*).

TRIBE V. **HELIANTHOIDEÆ.**

48*. **LAGASCEA,** *Cav.*

Rigid villous scabrid or subglabrous herbs. *Leaves* opposite or the upper alternate. *Heads* in leafy balls, which are solitary terminal and peduncled or in corymbose panicles, 1-fld.; fl. ☿, fertile, tubular, white red or yellow, tube short, limb elongate cylindric or dilated 5-fid. *Involucre* tubular, of 5 connate bracts; receptacle minute. *Anther-bases* sagittate, auricles obtuse. *Style-arms* elongate, acute, hairy. *Achenes* cuneate, compressed or 3-angled, tip rounded; pappus a toothed or fimbriate cup or ring, with sometimes bristles at the angles of the achene.—DISTRIB. Species 7, tropical American.

L. mollis, *Cav.*; *DC. Prodr.* v. 91; annual, stem and branches scabrid, leaves petioled ovate acuminate subcrenate silkily tomentose beneath, clusters of heads solitary terminating in slender naked peduncles, flowers white, pappus very obscure. *Clarke Comp. Ind.* 131. Noccæa mollis, *Jacq. Fragment.* t. 13.

A weed in cultivated places, in various parts of India.—DISTRIB. Indigenous in Central America; introduced in various warm countries.

Much branched, slender, young bracts villous with white hairs. *Leaves* 1–1½ in. *Heads* in clusters (resembling simple heads) ¾–1 in. diam., involucrate by elliptic leaves, very silky.

49. **ADENOCAULON,** *Hook.*

Erect annual or perennial herbs. *Leaves* alternate, lower long-petioled, white beneath. *Heads* small in glandular panicles, heterogamous, disciform; flowers all tubular; outer 4–7, ♀, fertile, rarely with imperfect achenes, limb 4–5-fid; disk fl. 4–5, ☿, sterile. *Involucre* campanulate; bracts 5, subequal, herbaceous; receptacle flat. *Anther-bases* entire or minutely 2-toothed. *Style-arms* of ♀ short, broad; of ☿ connate. *Achenes* obovoid, obscurely ribbed, covered with stalked glands; pappus 0.—DISTRIB. Species 5, Japan, Himalaya, N. America, and Chili.

A. bicolor, *Hook. Bot. Misc.* i. 19, t. 15; *DC. Prodr.* vii. 207; stem simple below, panicle and leaves beneath grey with appressed cottony tomentum, leaves orbicular subreniform or subhastate angled and toothed, petiole long winged or not. A. himalaicum, *Edgew. in Trans. Linn. Soc.* xx. 64; *Clarke Comp. Ind.* 132. A. adhærescens, *Maxim. Prim. Fl. Amur.* 152.

TEMPERATE HIMALAYA, from Simla, alt. 6–9000 ft., to Sikkim, alt. 7–12,000 ft.—DISTRIB. Manchuria, Japan, N. W. America.

Root of thick fibres, perennial. *Leaves* 3–4 in. diam., membranous, nerves slender reticulated; petiole with sometimes a toothed wing. *Panicle* with very slender spreading branches and viscid peduncles; heads ¼ in. *Achenes* much longer than the involucre, clothed densely, like the peduncle, with large stalked glands.—I find no material difference between the Himalayan, N. Asiatic, and N. American specimens.

50. **CHRYSOGONUM,** *Linn.*

Herbs or under-shrubs. *Leaves* opposite, entire toothed or pinnate. *Heads* solitary or corymbose, heterogamous, radiate, yellow; ray fl. ♀, 1-seriate, fertile, ligule entire or 2–3-toothed; disk fl. ☿, sterile, tubular, limb elongate 5-fid. *Involucre* ovoid or campanulate; bracts few, rigid; receptacle flat, with concave pales at the ☿ fl. *Anther-bases* entire or subsagittate. *Style* of ☿ undivided, hairy. *Achenes* of ray dorsally compressed, inner face often keeled or 2–3-ribbed,

margins acute or winged; pappus very short, obscure or 0.—DISTRIB. Species 6, 1 American, 2 Indian, and 3 Australian.

1. **C. heterophyllum,** *Benth. in Gen. Pl.* ii. 350; leaves simple ovate serrate or 3-lobed or pinnatifid or pinnate, segments ovate-lanceolate acutely serrate or gashed, heads $\frac{1}{4}$–$\frac{1}{2}$ in. diam., ligules few small, achenes obtuse or 2–3-horned at the tip. *Clarke Comp. Ind.* 132. Moonia heterophylla, *Arnott Pugill.* 31; *DC. Prodr.* vii. 289.

NILGHERRY and PULNEY MTS., *Wight.* CEYLON; central province, alt. 6–7000 ft., *Moon, &c.*

Annual, glabrous or sparsely hairy, 1–3 ft. high, branched. *Leaves* usually glabrous beneath, when simple $\frac{3}{4}$–$3\frac{1}{2}$ in., narrowed into the slender petiole, when compound usually smaller.

2. **C. Arnottianum,** *Benth. in Gen. Pl.* ii. 350; leaves 3-pinnatisect or pinnatifid, segments or lobes lanceolate serrate, heads 1–$1\frac{1}{2}$ in. diam., ligules many large. *Clarke Comp. Ind.* 132. Moonia Arnottiana, *Wight Ic.* t. 1105.

NILGHERRY MTS., *Wight.*

Thwaites, regarding this as a form of *heterophyllum*, refers the compound leaved Ceylon specimens of that plant to it; but I find no specimen of *heterophyllum* with such large heads, or with so many rays as *Arnottianum* has. Still the two are very closely allied; Clarke thinks them varieties, and I dare say they will prove so.

51. XANTHIUM, *Linn.*

Annual, coarse rough herbs, unarmed or with 3-fid spines. *Leaves* alternate, toothed or lobed. *Heads* monœcious (♀ and ☿), axillary; ☿ in the upper axils, globose, many-fld., sterile, tubular, 5-toothed; ♀ 2-fld., fertile, apetalous. *Involucre* of ☿ head short; bracts few, 1–2-seriate, narrow; receptacle cylindric, with hyaline pales enclosing the flowers; invol. of ♀ heads with the bracts united into an ovoid 2-beaked herbaceous utricle with 2 1-fld. cells, clothed with hooked bristles and with sometimes a few small free outer bracts. *Filaments* monadelphous; anthers free, bases obtuse, tips mucronate inflexed. *Style* of ☿ slender, undivided; of ♀ arms free, exserted from the involucre. *Achenes* enclosed in the hardened involucral cells, obovoid, thick; pappus 0.—DISTRIB. Species about 4, probably all of American origin.

X. strumarium, *Linn.*; *Boiss. Fl. Orient.* iii. 251; unarmed, leaves petioled scabrid triangular-cordate or orbicular lobed and toothed, base cuneate, heads in terminal and axillary racemes, fruiting involucres ovoid or oblong, beaks erect or diverging. *Clarke Comp. Ind.* 132. X. indicum, *DC. in Wight Contrib.* 17; *Wall. Cat.* 3181; *Dalz. & Gibs. Bomb. Fl.* 127; *Roxb. Fl. Ind.* iii. 601. X. Roxburghii, discolor, *and* brevirostre, *Wallroth*; *Walp. Rep.* vi. 151. X. orientale, *Blume Bijd.* 915.

Throughout the hotter parts of INDIA and CEYLON, usually near houses; ascending the Western Himalaya to 5000 ft.

52. SIEGESBECKIA, *Linn.*

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, subradiate, yellow or white; ray fl. ♀, 1-seriate, fertile, tube short, limb 2–3-fid; disk fl. ☿, fertile, or the inner sterile, tubular, limb campanulate and 5-fid, or narrow and 3–4-toothed. *Involucre* campanulate or hemispheric; bracts few, herbaceous, glandular, outer spathulate spreading, inner enclosing the ray fl.; receptacle small; pales membranous, concave, often enclosing the flowers. *Anther-bases* entire. *Style-arms* of ☿ short, flattened,

subacute. *Achenes* obovoid-oblong, not compressed, often incurved, obtuse; pappus 0.—DISTRIB. Species 2, a cosmopolitan tropical and subtropical and a Peruvian one.

S. orientalis, *Linn.*; *Boiss. Fl. Orient.* iii. 250; erect, pubescent with crisped hairs, leaves triangular-ovate toothed or crenate, base incised truncate or cuneate, outer invol. bracts equalling or exceeding the inner, outer achenes rough. *DC. Prodr.* v. 495; *Wight Ic.* t. 1103; *Wall. Cat.* 3182; *Dalz. & Gibs. Bomb. Fl.* 127. S. glutinosa, *Wall. Cat.* 3182. S. brachiata *and* orientalis? *Roxb. Fl. Ind.* iii. 432. Minyranthes heterophylla, *Turcz. in Bull. Soc. Imp. Nat. Misc.* 1851, i. 181.

Throughout INDIA, ascending to 5000 ft. in the Himalaya and other mountains.—DISTRIB.—Cosmopolitan in warm climates.

An annual, 1–3 ft., with spreading opposite lower branches. *Leaves* 1–4 in. long and broad, long-petioled.

53. ENHYDRA, *Lour.*

Glabrous or scaberulous marsh-herbs. *Leaves* opposite, sessile. *Heads* axillary, subsessile, unilateral or in alternate axils, heterogamous, subradiate; ray fl. ♀, ∞-seriate, fertile, ligule minute broad 3–4-toothed; disk fl. ☿, fertile, or the inner sterile, tubular, limb campanulate 5-fid. *Invol. bracts* 4, foliaceous, in opposite pairs, 2 outer larger; receptacle convex or conic, pales enclosing the flowers tipped with glandular hairs. *Anther-bases* obtuse, entire. *Style-arms* of ☿ obtuse, tips hispid. *Achenes* oblong, enclosed in the rigid pales, outer dorsally, inner sometimes laterally compressed; pappus 0.—DISTRIB. Species about 6, tropical and subtropical.

E. fluctuans, *Lour. Fl. Coch.* 511; pubescent or glabrous, glandular, leaves sessile linear-oblong acute or obtuse entire or subcrenate, heads axillary and terminal sessile. *DC. Prodr.* v. 637. E. Heloncha, *DC. l. c.* Hingtsha repens, *Roxb. Hort. Beng.* 62; *Fl. Ind.* iii. 448. Megera Helongcha, *Ham. in Wall. Cat.* 3195. Tetractis paludosa, *Blume Bijd.* 892.

EASTERN BENGAL, ASSAM, and SILHET.—DISTRIB. Sumatra, Malay, China.

Usually quite glabrous; stems 1–2 ft., elongate, simple or divaricatingly branched, rooting at the nodes. *Leaves* 1–3 in., variable in breadth, base narrowed or truncate. *Heads* $\frac{1}{3}$–$\frac{2}{3}$ in. diam.

54. ECLIPTA, *Linn.*

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, peduncled, heterogamous, rayed; ray-fl. ♀, sub-2-seriate, fertile or sterile; ligule small, entire or 2-toothed, white rarely yellow; disk-fl. ☿, fertile, tubular, limb 4–5-fid. *Involucre* broadly campanulate; bracts sub-2-seriate, herbaceous, outer large and broad; receptacle flat, or nearly so, pales enclosing several flowers, inner narrow or 0. *Anther-bases* obtuse, subentire. *Style-arms* flattened, with short or triangular obtuse appendages. *Achenes* of ray narrow, triquetrous, often empty; of the disk stouter, laterally subcompressed; top entire, toothed or 2-aristate.—DISTRIB. Species 3 or 4, an Australian, a S. American and a cosmopolitan tropical weed.

1. **E. alba,** *Hassk.*; *Clarke Comp. Ind.* 134; hirsute or strigillose, leaves sessile linear or oblong-lanceolate subentire narrowed at both ends, peduncles 1–2 axillary short or long and slender, invol.-bracts ovate obtuse or acute about equalling or exceeding the flowers. E. erecta, *Lamk. Ill.* t. 687. E. erecta *and* alba, *Dalz. & Gibs. Bomb. Fl.* 117. E. alba *and* marginata, *Boiss. Fl. Orient.* iii. 249. E. erecta *and* prostrata, *Linn. Mant.* 266. Verbesina alba *and* pro-

strata, *Linn.* E. prostrata, *Roxb. Fl. Ind.* iii. 438. E. prostrata, undulata *and* parviflora, *Wall. Cat.* 3209, 3210, 3213.

Throughout India; ascending to 6000 ft. in the Himalaya and other mountains. Distrib. Cosmopolitan in warm climates.

An erect or diffuse branched, slender weed. *Leaves* 1–4 in. long, very variable in form and width. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

55. SCLEROCARPUS, *Jacq.*

Strigose or villous herbs. *Leaves* alternate or opposite. *Heads* terminal or in the forks, or leaf-opposed; heterogamous, rayed, yellow; ray-fl. neuter, 1-seriate, ligule spreading; disk-fl. ☿, fertile, tubular, limb 3–5-fid. *Involucre* campanulate; bracts few, 2-seriate, all or the tips herbaceous, outer spreading; receptacle convex or conic; pales enfolding the base of the ☿ fl. and finally hardening round the achenes. *Anther-bases* subentire. *Style-arms* of ☿ elongate, acute obtuse or subclavate. *Achenes* obovoid, subcompressed, glabrous, narrowed below, enclosed in the rugose often beaked pales; pappus 0 or a ring. —Distrib. Species about 11, tropical American, Asiatic and African.

1. **S. africanus,** *Jacq. Ic. Pl. Rar.* 17, t. 176; annual, erect, hispidly hairy, leaves opposite petioled ovate acute serrate 3–5-nerved, heads peduncled or sessile, achenes glabrous. *DC. Prodr.* v. 566; *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 134.

Western Himalaya; from Simla to Kumaon, *Royle*, &c., ascending to 5500 ft. in fields. Punjab, *Aitchison.* Banda, *Edgeworth.* The Concan; Joneer and highest hills east of Bombay, *Dalzell*, &c. The Circars, *Gibson.*—Distrib. Tropical E. & W. Africa.

An erect herb, 1–2 ft.; branches stiff, terete, opposite. *Leaves* $1\frac{1}{2}$–3 in., narrowed into the petiole. *Heads* $\frac{1}{3}$–$\frac{1}{2}$ in diam. *Pales* enclosing the curved, gibbous, ribbed achenes.

56. BLAINVILLEA, *Cass.*

Scabrid or villous herbs. *Leaves* opposite, or the upper alternate, petioled, toothed. *Heads* small, subsessile or peduncled, terminal or axillary, heterogamous, radiate or subdisciform, yellow; ray-fl. ♀, 1–2-seriate, fertile; ligules small 2–3-toothed or 0; disk-fl. ☿, fertile, tubular, limb dilated 5-fid. *Involucre* broadly ovoid or subglobose; bracts few, outer herbaceous, inner passing into the rigidly membranous concave or folded scales of the small convex receptacle. *Anther-bases* obtuse, entire. *Style-arms* of ☿ narrow, flattened, with acute or subobtuse appendages. *Achenes* truncate, of ray 3-quetrous or dorsally compressed, of the disk 3–4-angled or laterally compressed; pappus of 2–5 unequal bristles, connate at the base.—Distrib. Species about 10, all tropical.

1. **B. latifolia,** *DC. in Wight Contrib.* 17; *Prodr.* v. 492; annual, hispidly hairy, leaves opposite or upper alternate petioled ovate crenate-serrate 3-nerved, heads peduncled, invol. bracts oblong obtuse rigid, achenes of the ray cuneiform triquetrous curved. *Dalz. & Gibs. Bomb. Fl.* 127; *Clarke Comp. Ind.* 135. B. rhomboidea, *Cass.*; *DC. l. c.* B. alba *and* hispida, *Edgew. in Trans. Linn. Soc.* xx. 70. Eclipta latifolia, *Linn.* f. Verbesina dichotoma, *Wall. Cat.* 3204, A. *in part*, B. C. D. E. V. Lavenia, *Roxb. Fl. Ind.* iii. 442.

Western India; from the upper Gangetic plain westwards, ascending to 5000 ft. in Kumaon in fields. Banda, *Edgeworth.* The Deccan and Ceylon.—Distrib. Tropical Asia, Africa, America and Australia.

A weed, 1–2 ft., rigid; branches terete, lower opposite, upper alternate. *Leaves* 2–4 in. long, base cuneate. *Heads* $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; ligules yellow or whitish.

57. **WEDELIA**, *Jacq.*

Scabrid pubescent or hirsute herbs or undershrubs. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, radiate, yellow; ray-fl. ♀, fertile, ligule spreading entire or 2-toothed; disk-fl. ☿, fertile or the central sterile, tubular, limb elongate 5-toothed. *Invol. bracts* sub-2-seriate, outer 3-5 usually herbaceous or foliaceous, inner dry; receptacle flat or convex, pales enclosing the flowers. *Anther-bases* entire or subsagittate. *Style-arms* of ☿ with acute hairy tips. *Achenes* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus 0, or a toothed cup or ring, or of short scales, with sometimes a few bristles.—DISTRIB. Species about 45, tropical and subtropical.

1. **W. calendulacea,** *Less.*; *DC. in Wight Contrib.* 17; *Prodr.* v. 539; procumbent, strigillose or glabrate, leaves subsessile linear-oblong or oblanceolate acute or obtuse entire or sub-crenate scaberulous above 1- rarely 3-nerved, heads solitary on long slender axillary peduncles, outer invol. bracts large oblong obtuse herbaceous much longer than the disk-fl., achenes of the ray 3-quetrous tip truncate. *Wight Ic.* t. 1107; *Arn. in Hook. Comp. Bot. Mag.* i. 81, t. 5; *Clarke Comp. Ind.* 136; *Dalz. & Gibs. Bomb. Fl.* 129. W. bengalensis?, *Rich. in Pers. Synops.* ii. 490. Verbesina calendulacea, *Linn.*; *Roxb. Fl. Ind.* iii. 440; *Wall. Cat.* 3205. Joegeria calendulacea, *Spreng. Syst.* iii. 590.—*Burm. Fl. Zeyl.* 52, t. 22, f. 1.

In wet places, BENGAL, ASSAM, SILHET, the EASTERN and WESTERN PENINSULAS and CEYLON.—DISTRIB. Malay Islds., China, Japan.

Stem 6–18 in., rooting at the lower nodes, glabrous or scabrid. *Leaves* 1–3 in., variable in breadth, hairs on both sufaces scattered, appressed, rigid, white. *Heads* 1–1½ in. diam; peduncles 1–6 in., swollen below the turbinate involucre.

2. **W. urticæfolia,** *DC. in Wight Contrib.* 18; *Prodr.* v. 539 *var. β only*; erect, slender, hispid or scabrid, leaves petioled ovate acuminate serrate 3-nerved, heads 1–3 peduncled, invol. bracts ovate-lanceolate acuminate exceeding the disk-fl., achenes elongate-cuneate 3-quetrous tip broad truncate. *Wight Ic.* t. 1106. Woollastonia biflora, *Dalz. & Gibs. Bomb. Fl.* 128, *excl. syn.* Verbesina biflora, *Wall. Cat.* 3207 B., *in part.*

WESTERN PENINSULA; on the Ghats from the Concan southwards.

Stem and *branches* weak, pale, grooved. *Leaves* 3–5 in., petiole short or long, slender. *Heads* ¾–1 in. diam.; invol. bracts scabrid. *Pappus* usually 0, rarely of 1–2 bristles.

3. **W. biflora,** *DC. in Wight Contrib.* 18; climbing, glabrous or scaberulous, leaves petioled ovate acuminate serrate, heads 1–3 peduncled, invol. bracts oblong or ovate-lanceolate often recurved equalling or exceeding the disk, achenes shortly cuneate 3–4-angled rough tip broad truncate. W. scandens, *Clarke Comp. Ind.* 136, *excl. syn.* ? W. biflora, *Kurz in Journ. As. Soc.* 1877, ii. 176. Woollastonia biflora *and* scabriuscula, *DC. Prodr.* v. 546, 547. W. biflora, *Wt. Ic.* t. 1108. Verbesina biflora, *Linn.*; *Wall. Cat.* 3207 A., *in part*, F. V. dichotoma, *Wall. Cat.* 3024 A., *partly* F. II. Eclipta scabriuscula, *Wall. Cat.* 3212, *chiefly.* Acmella biflora, *Spreng. Syst.* iii. 591.—*Rheede Hort. Mal.* x. t. 40.

Near the sea from BENGAL and BOMBAY to CEYLON and SINGAPORE.—DISTRIB. Tropical shores of Eastern Asia.

Very like *W. urticæfolia*, but less hispid, climbing, and with much shorter broader achenes.

4. **W. Wallichii,** *Less. in Linnæa*, vi. 162; suberect, hispid or scabrid, leaves petioled ovate acuminate serrate 3-nerved sometimes softly pubescent beneath, outer invol. bracts oblong obtuse or acute equalling or exceeding the disk-fl., achenes obovoid compressed or obtusely 3-angled, tip contracted. W. urticæfolia, *var. a and γ, DC. Prodr.* v. 540. W. scaberrima, *Wall. Cat.* 3208. W. biflora, *Clarke Comp. Ind.* 137. ? Verbesina biflora, *Roxb. Fl. Ind.* iii. 440. V. biflora, *Wall. Cat.* 3204 E., 3207 E. Eclipta scabriuscula, *Wall. Cat.* 3212, *partly*. Ecliptacea, *Wall. Cat.* 3208.

TROPICAL HIMALAYA; alt. 0–5000 ft., from Kumaon, *Edgeworth*, to Bhotan and the Mishmi Mts., *Griffith*. KHASIA MTS. and BIRMA.—DISTRIB. Java.

58. SPILANTHES, *Linn.*

Annual herbs. *Leaves* opposite. *Heads* usually long-peduncled, axillary or terminal, heterogamous and radiate or homogamous and disciform, ray-fl. ♀, 1-seriate, fertile, ligule white or yellow; disk-fl. ☿, fertile, tubular, limb 4–5-fid. *Involucre* ovoid or campanulate, bracts sub-2-seriate; receptacle convex, elongate, pales enclosing the flowers often connate with the ovary into a stalk. *Anther-bases* truncate, entire or 2-toothed. *Style-arms* of ☿ truncate. *Achenes* of ray triquetrous or dorsally compressed, margins and angles usually ciliate; pappus 0, or of 2–3 bristles.—DISTRIB. Species about 20, chiefly tropical American.

1. **S. Acmella,** *Linn.*; erect or ascending, leaves petioled ovate-lanceolate crenate-serrate or entire 3-nerved, heads ovoid solitary or panicled, ligules minute. *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 128; *Kurz in Journ. As. Soc.* 1877, ii. 176. Verbesina Acmella *and* Pseuda-acmella, *Linn.* Acmella Linnæa, *Cass.*

Throughout INDIA; ascending the Himalaya and other mountains to 5000 ft.—DISTRIB. All warm countries.

VAR. 1. *Acmella proper*, Clarke l. c.; peduncles subsolitary, achenes margined scabrid, pappus usually of 1–2 bristles. S. Acmella, *DC. Prodr.* v. 623; *Wall. Cat.* 3285. S. calva, *Wight Ic.* t. 1109.—Throughout India.

VAR. 2. *calva*, Clarke l. c.; peduncles subsolitary, achenes smoother, pappus usually obsolete. S. calva, *DC. Prodr.* v. 625. S. Pseudo-acmella, *Linn.*; *DC l. c. and in Wight Contrib.* 19; *Wall. Cat.* 3185. Cotula conica, *Wall. Cat.* 3185.—Throughout India.

VAR. 3. *oleracea*, Clarke l. c.; more robust and succulent, heads and leaves larger, peduncles subsolitary, achenes as in var. 1. S. oleracea, *Jacq. Hort. Vind.* ii. t. 135; *Roxb. Fl. Ind.* iii. 410; *DC. Prodr.* v. 624. Bidens fervida *and* fixa, *Lamk. Dict.* i. 415. 416.—Cultivated in gardens.

VAR. 4. *paniculata*, Clarke l. c.; taller, more branched, heads numerous panicled, achenes strongly margined sparsely scabrid, pappus bristles 1–2. S. paniculata, *DC. l. c.* 625; *Wall. Cat.* 3186.—Birma, *Wallich*, &c.; Sikkim, *J. D. H.*; Banda, *Edgeworth*; Madras Coll., *G. Thomson*. I suspect this to be a cultivated form.

58*. GUIZOTIA, *Cass.*

Annual herbs. *Leaves* opposite, or the upper alternate. *Heads* peduncled, axillary and terminal, heterogamous, rayed; ray-fl. ♀, 1-seriate, fertile; ligule 2–3-toothed, yellow; disk-fl. ☿, fertile, limb campanulate 5-fid.; tube of both short, woolly, embracing the top of the achene. *Involucre* campanulate; bracts sub-2-seriate, outer subfoliaceous, inner like the pales; receptacle convex or conic; pales flat, scarious. *Anther-bases* truncate, entire. *Style-arms* of ☿, with subulate hairy tips. *Achenes* glabrous, dorsally compressed, tip rounded; pappus 0.—DISTRIB. Species 3, tropical African.

G. abyssynica, *Cass. in Dict. Sc. Nat.* 59, 248; pubescent upwards, leaves sessile ½-amplexicaul ovate-lanceolate or subcordate serrate, invol. bracts 5. G. oleifera, *DC. in Mem. Soc. Hist. Nat. Genev.* v. 7, *cum Ic.*; *Prodr.* v. 551; *Dalz. & Gibs. Bomb. Fl.* 128; *Wight. Ill.* t. 132; *Clarke Comp. Ind.* 139. Helianthus oleifera, *Wall. Cat.* 3194, *and* Bidens Ramtilla, 3191. Ramtilla oleifera, *DC. in Wight. Contrib.* 18. Heliopsis platyglossa, *Cass. l. c.* 24, 332. Verbesina sativa, *Bot. Mag.* t. 1017; *Roxb. Fl. Ind.* iii. 441. Polymnia abyssynica, *Linn. f. Suppl.* 383.

Cultivated in various parts of INDIA. A native of tropical Africa.

A stout, erect, smooth or scabrid, leafy herb, 1–3 ft. high, stem often as thick as the little finger. *Leaves* 3–5 in., sessile, ½-amplexicaul, linear or lanceolate-oblong, obtuse, serrate. *Heads* ½–1 in. diam.; peduncles naked, 1–2 in.; outer invol. bracts broadly elliptic or ovate, obtuse, green; ligules few, broad.

58**. SYNEDRELLA, *Gærtn.*

Annual, branched, pubescent or villous herbs. *Leaves* opposite, petioled, toothed. *Heads* small, heterogamous, radiate; ray-fl. 1–2-seriate, fertile, ligule short broad 2–3-toothed yellow; disk-fl. ☿, fertile, tubular, limb 4-toothed. *Involucre* ovoid or oblong; bracts few, 1–2 outer usually foliaceous, inner like the pales; receptacle small, pales scarious flat. *Anther-bases* subentire. *Style-arms* of ☿ with long acute tips. *Achenes* of ray dorsally compressed, 2-winged, smooth, wings lacerate, of the disk few narrower compressed or triquetrous often muricate, the angles of both terminating in spines.—DISTRIB. Species 2, tropical American, one also African and Asiatic.

S. nodiflora, *Gærtn. Fruct.* ii. 456, t. 171, f. 7; *Hook. Exot. Fl.* t. 60; *Clarke Comp. Ind.* 139. Verbesina nodiflora, *Linn. Amoen. Acad.* iv. 290.

The cultivated places, ASSAM, *Jenkins*; MARTABAN, *Stoliczka*; ANDAMAN ISLDS., *Kurz.*—DISTRIB. Tropical America.

An erect dichotomously branched herb; stem and branches terete, glabrous. *Leaves* ovate-lanceolate, shortly petioled, serrate, scaberulous, 3-nerved. *Heads* sessile, axillary and terminal; inner invol. bracts linear-lanceolate, shining. *Achenes* slender, black; spines 2–3 times as long, erect, very stout.

59. GLOSSOCARDIA, *Cass.*

A branched, annual, glabrous herb. *Leaves* alternate, slender, 1–2-pinnatisect. *Heads* small, terminal and axillary, heterogamous, rayed, yellow; ray-fl. ♀, usually solitary, fertile, ligule 2-fid; disk-fl. ☿, few, fertile, tubular, limb 4-fid. *Involucre* oblong; bracts few, inner oblong with broad membranous margins, outer 1–3 slender; receptacle small, flat; pales few, flat. *Anther-bases* obtuse, entire. *Style-arms* of ☿ with linear, acute, hispid tips. *Achenes* narrowly oblong, dorsally much compressed, faces bearded; pappus of 2 smooth stiff awns.

1. **G. linearifolia,** *Cass. in Dict. Sc. Nat.* xix. 62. G. Bosvallia, *DC. in Wight Contrib.* 19; *Prodr.* v. 631; *Wt. Ic.* t. 1110; *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 139. Verbesina Bosvallia, *Linn. f. Suppl.* 379. V. Boswellia, *Roxb. Fl. Ind.* iii. 443. Pectis meifolia, *Wall. Cat.* 3198.

ROHILKUND; at Delhi, *Clarke.* BANDA, *Edgeworth.* CENTRAL INDIA and the DECCAN.

Prostrate or erect, diffusely branched from the base; branches 3–10 in. long, strict or flexuous. *Leaves* ½–2 in., 2-pinnatisect, petiole long slender, blade broadly ovate in outline, segments filiform. *Heads* ⅓ in. long, shortly peduncled; inner invol. bracts large, obtuse, with a striated disk and pale margins. *Achenes* ¼ in long.—Odour of fennel.

60. BIDENS, *Linn.*

Annual or perennial, sometimes climbing herbs. *Leaves* opposite, entire toothed gashed or 1–2-pinnate. *Heads* corymbosely panicled or subsolitary, heterogamous and rayed or homogamous and disciform; ray-fl., if present, ♀ or neuter, 1-seriate, ligule spreading yellow or white; disk-fl. ☿, fertile, tubular, limb cylindric 5-fid. *Involucre* campanulate or hemispheric; bracts sub-2-seriate, bases connate, outer herbaceous short or leafy, inner membranous; receptacle flat or convex, pales narrow nearly flat. *Anther-cells* entire or sub-sagittate. *Style-arms* of ☿ hairy above, tips short acute or long and subulate. *Achenes* 4-gonous or dorsally compressed, linear or cuneiform, often narrowed but not beaked above; pappus of 2–4 rigid, retrosely hispid bristles or 0.—DISTRIB. Species about 50, chiefly American.

* *Achenes cuneiform, tip truncate.*

1. **B. cernua,** *Linn.*; *Boiss. Fl. Orient.* iii. 250; leaves undivided serrate bases subconnate, heads drooping, outer invol. bracts leafy, inner ovate, achenes with 1–4 short awns or 0. *Clarke Comp. Ind.* 140.

WESTERN HIMALAYA; Kashmir and Chumba, alt. 5–6000 ft., rare, *Thomson.*—DISTRIB. N. Asia, N. and mid. Europe, N. America.

Annual, stout, erect, glabrous. *Leaves* 3–5 in., base sometimes auricled. *Heads* ¾–1 in. diam.; inner invol. bracts broad, membranous, pale brown; ligules 0 in Indian specimens. *Achenes* very variable, cuneate, compressed, margins sometimes thickened and armed with short recurved spines.

2. **B. tripartita,** *Linn.*; *Boiss. Fl. Orient.* iii. 251; leaves 3-lobed 3-partite or pinnatifid, segments lanceolate toothed, heads erect solitary discoid, outer invol. bracts herbaceous, inner oblong with scarious margins, achenes with 2–3 short awns. *Clarke Comp. Ind.* 140. B. repens, *Don Prodr.* 180; *DC. Prodr.* v. 595; *Wall. Cat.* 3187, A.; *Clarke Comp. Ind.* 140. B. trifida, *Roxb. Fl. Ind.* iii. 411. B. frondosa, *Herb. Ham.*

CENTRAL and WESTERN HIMALAYA, in marshes, alt. 3–5000 ft., from Nipal to Kashmir. WESTERN TIBET; Iskardo, *Thomson.*—DISTRIB. N. Asia, Japan, and westwards to N. Africa, W. Europe and N. America.

Stout, annual, erect, 1–3 ft. high, glabrous. *Leaves* 3–5 in. *Heads* ¾ in. diam., peduncles long or short; outer invol. bracts exceeding the inner. *Achenes* ¼ in., glabrous; awns very short.

** *Achenes long, slender, narrowed from the middle to the top.*

3. **B. pilosa,** *Linn.*; glabrous or hairy, leaves 3-fid 3-foliolate or 1–2-pinnatifid, achenes ⅓–⅔ in.

Throughout India, ascending the Himalaya and other mountains to 6000 ft.—DISTRIB. All warm countries.

A very variable, erect, glabrous pilose or pubescent herb, 6–24 in high, a well-known pest from the adhesion of its barbed achenes to the garments and body. *Leaves* excessively variable. *Heads* on long stout peduncles, very variable in length, with or without white or yellow rays; invol. bracts with broad scarious margins. *Achenes* black, much exceeding the involucre, very slender, with 2–4 short, stout, spinescent awns covered with recurved hooks.

VAR. 1. *pilosa proper*; leaves 3-fid or 3-sect., segments broadly or narrowly ovate or lanceolate serrate. B. pilosa, *Linn.*; *DC. Prodr.* v. 597; *Clarke Comp. Ind.* 140. B. leucantha, *Willd.* B. chinensis, *Willd*; *Wall. Cat.* 3189, A. B. C. B. tripartita *and* B. bipinnata, *Wall. Cat.* 3187, B. C. D.

VAR. 2. *bipinnata*; leaves bipinnatifidly compound, segments ovate lanceolate or linear entire lobed or toothed. B. bipinnata, *Linn.*; *Roxb. Fl. Ind.* iii. 411. B.

chinensis, *Wall. Cat.* 3189, D. E. F. B. Wallichii, *DC. Prodr.* v. 598; *Dalz. & Gibs. Bomb. Fl.* 129.

VAR. 3. *decomposita*; leaves decompoundly pinnatifid, segments linear slender. B. decomposita, *Wall. in DC. Prodr.* v. 602; *Cat.* 3188; *Clarke Comp. Ind.* 141, *excl. var. β.*

EXCLUDED SPECIES.

B. DECOMPOSITA, *var. β hirsutior*, Clarke (Comp. Ind. 141), from 7500 ft. in the Nilgherry Mts. I have seen no specimen of this, which Clarke informs me he now supposes to be some cultivated plant.

B. CALVA, Clarke l. c. (Adenolepis calva, *Schultz-Bip. in Herb. Hohenack. n.* 344) is *Cosmos sulphureus*, Cav., a cultivated plant.

61. GLOSSOGYNE, .

Perennial glabrous herbs, with almost naked stems and branches. *Leaves* radical, crowded, pinnatifid or cuneate and 3-toothed, cauline alternate or the lower opposite, or 0. *Heads* small, few, corymbose, heterogamous and rayed, or homogamous and disciform; ray-fl. ♀, fertile, ligules spreading yellow (or white?); disk-fl. ☿, fertile, tubular, limb 5-fid. *Involucre* small; bracts 2–3-seriate, narrow, bases connate; receptacle flat; pales scarious, flat or concave. *Anther-bases* obtuse. *Style-arms* of ☿ with long hairy tips. *Achenes* dorsally compressed, linear, ovoid or almost winged, glabrous, truncate; pappus of 2 retrosely scabrid bristles.—DISTRIB. Species 5, tropical Asiatic and Australian.

1. **G. pinnatifida,** *DC. in Wight Contrib.* 19; *Prodr.* v. 632; branches slender forked, leaves mostly radical pinnatifid triangular in outline, segments linear acute. *Dalz. & Gibs. Bomb. Fl.* 129; *Clarke Comp. Ind.* 141. B. rigida, *Hort. Calc.* Zinnia Bidens, *Retz Obs.* v. 28; *Roxb. Fl. Ind.* iii. 435. Bidens pinnatifida, *Heyne in Wall. Cat.* 3190.

Plains of WESTERN INDIA; from Jamu and Garwhal to Western Bengal and Behar, and southwards to Madras.

Root fusiform, woody. *Leaves* with the petiole 1–2 in.; segments few, often recurved, acute, coriaceous. *Flowering* branches 6–12 in., strict, stiff, grooved, nearly leafless. *Heads* in flower ¼ in. diam.; invol. bracts linear, obtuse, ⅙ in. long. *Achenes* ¼–⅓ in., deeply grooved, black.

62. CHRYSANTHELLUM, *Rich.*

Annual glabrous herbs. *Leaves* alternate, pinnatifid, or radical toothed. *Heads* small, peduncled, terminal and axillary, heterogamous, rayed; ray-fl. ♀, 1-seriate, fertile, ligule spreading entire or 2-toothed yellow; disk-fl. ☿, fertile, tube short, limb campanulate 5-fid. *Involucre* hemispheric; bracts 1–2-seriate; receptacle flat; pales narrow, flat, scarious. *Anther-bases* obtuse, entire. *Style-arms* of ☿ slender, tips long subulate. *Achenes* linear-oblong, dorsally compressed, smooth, or the outer tubercled externally, outer thick with obtuse margins, inner flat 2-winged; pappus a minute corona.—DISTRIB. Species 2 or 3, tropical Asia, Africa and America.

1. **C. indicum,** *DC. Prodr.* v. 631; achenes all cuneate-oblong obcompressed grooved smooth margins very thick not winged. *Deless. Ic. Sel.* iv. t. 39; *Clarke Comp. Ind.* 142, *excl. syn.* Bidens? Bandanna, *Wall. Cat.* 3291. Hinterpubera Kotschyi, *Schultz-Bip. in Herb. Schimper*, n. 1630.

UPPER GANGETIC plains, *Royle, Thomson.* KUMAON and GARWHAL, at Hawalbagh and Nynee-tal, alt. 4000 ft., *Madden*, &c. NAGPORE, *Munro.*—DISTRIB. Madagascar, Tropical Africa.

Branches spreading from the root, procumbent, diffuse, leafy. *Leaves* succulent, 1–3 in. long, deltoid in outline, 2-pinnatifid; segments oblong or cuneiform, obtusely

lobed or cut. *Heads* $\frac{1}{4}$ in. diam. in flower, $\frac{1}{2}$ in. in fruit. *Achenes* $\frac{1}{10}$ in. long, equalling the invol. bracts. This has been united with the American and Senegal species by Bentham, Clarke and others; but the achenes are smaller and never broadly winged as in the American species.

62*. GALINSOGA, *Ruiz et Pav.*

Annual herbs. *Leaves* opposite, entire or toothed. *Heads* small, peduncled, subterminal and axillary, heterogamous, rayed; ray-fl. few, ♀, 1-seriate, fertile, ligule yellow spreading; disk-fl. ☿, fertile, tubular, limb 5-fid. *Involucre* hemispheric; bracts few, 1–2-seriate, ovate, obtuse, striate; receptacle conic or elongate; pales slender, serrate. *Anther-bases* subentire. *Style-arms* of ☿ acute or with an acute short tip. *Achenes* angled or the outer dorsally compressed; pappus of a few scarious, entire awned or fimbriate scales, of the ray often 0.—DISTRIB. Species 5, tropical American.

G. parviflora, *Cav. Ic.* iii. 41, t. 281; *DC. Prodr.* v. 677; *Clarke Comp. Ind.* 112.

A weed in cultivated and waste places in the HIMALAYA, alt. 4–8000 ft., introduced from America.

A weak, erect, hispid or glabrous herb, 6–12 in. high. *Leaves* petioled, 1–2 in., membranous, ovate, obtusely acuminate, 3-nerved, subserrate. *Heads* $\frac{1}{4}$ in. diam.; peduncles very slender; invol. bracts broad, green.

62**. TRIDAX, *Linn.*

Perennial herbs. *Leaves* opposite, pinnatisect; segments few, narrow. *Heads* very long-peduncled, heterogamous, rayed; ray-fl. ♀, fertile, ligulate or 2-lipped, with the outer lip large 3-fid or 3-partite, the inner small 2-lobed or -parted or 0; disk-fl. ☿, fertile, tubular, limb elongate 5-fid. *Invol. bracts* few-seriate, outer short, broad, herbaceous; receptacle flat or convex; pales membranous. *Anther-bases* with short, acute auricles. *Style-arms* of ☿ hairy above, tips subulate. *Achenes* turbinate or oblong, silky; pappus of short or long aristate, feathery bristles.—DISTRIB. Species 7, tropical American, of which one is introduced into India.

T. procumbens, *Linn.*; *DC. Prodr.* v. 679; procumbent, hirsute, leaves ovate or lanceolate deeply irregularly serrate, peduncles 2–3 times as long as the stem. *Wall. Cat.* 3197; *Clarke Comp. Ind.* 142.

Abundant in various parts of INDIA, introduced from S. America.

A weak straggling herb, 1–2 ft. long, with few leaves 1–2 in. long, and very long slender solitary peduncles a foot long and more. *Heads* $\frac{3}{4}$ in. diam. *Achenes* brown; pappus $\frac{1}{6}$ in. long, shining.

TRIBE VI.—ANTHEMOIDEÆ.

63. ACHILLEA, *Linn.*

Perennial pubescent or villous herbs. *Leaves* alternate, narrow, serrulate or pinnatisect. *Heads* small, corymbose, heterogamous and rayed or homogamous and disciform; ray-fl. few, ♀, rarely neuter, ligule short white pink or yellow; disk-fl. ☿, fertile, tube terete or compressed and 2-winged, base often produced over the top of the achene, limb 5-fid. *Invol. bracts* in few series, appressed, margins often scarious and black, outer shorter; receptacle flat or elevated, pales membranous. *Anther-bases* obtuse. *Style-arms* of ☿ with truncate and penicillate tips. *Achenes* oblong or obovoid, dorsally compressed, glabrous, with 2 cartilaginous wings; pappus 0.—DISTRIB. About 50, of temp. N. regions.

A. millefolium, *Linn.*; *Boiss. Fl. Orient.* iii. 255; glabrous or pubescent, leaves narrowly oblong-lanceolate 3-pinnatisect, heads corymbose ovoid shortly peduncled. *DC. Prodr.* vi. 24; *Reich. Ic. Fl. Germ.* t. 1826; *Clarke Comp. Ind.* 143. A. cuspidata, *DC. l. c.* 30; *Wall. Cat.* 3230.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–9000 ft.—DISTRIB. N. Asia, Europe, N. America.

Root stoloniferous. *Stem* ½–1½ ft., furrowed, leafy. *Leaves* 2–6 in., radical petioled, segments close-set acute. *Heads* many, ¼ in. diam.; invol. bracts oblong, obtuse rigid; ligules many, orbicular, white pink or purple, reflexed. *Achenes* shining.

EXCLUDED SPECIES.

A. SQUARROSA, *Ait.*; *DC. Prodr.* vi. 33; *Clarke Comp. Ind.* 143; said to have been introduced into the Calcutta gardens, or Assam, is not a native of India.

64. ANTHEMIS, *Linn.*

Annual or perennial herbs. *Leaves* alternate, deeply toothed or pinnatisect. *Heads* terminal, peduncled, rarely corymbose, heterogamous and radiate (very rarely disciform), ray-fl. ♀, fertile sterile or neuter, 1-seriate, tube terete or 2-winged, ligule spreading; disk-fl. ☿, fertile, tube compressed or 2-winged, base usually 1–2-gibbous, limb 5-fid. *Involucre* hemispheric; bracts ∞-seriate, appressed, rigid, margins scarious, outer shorter; receptacle convex or elongate; pales broad or narrow, rigid or hyaline, sometimes embracing the flowers. *Anther-bases* obtuse. *Style-arms* of ☿ with truncate penicillate tips. *Achenes* oblong, glabrous, 4–5-angled, 8–10-ribbed or many-striate, truncate; pappus 0 or very short, paleaceous or of a membranous large or small auricle.—DISTRIB. Species about 70, European, N. & W. Asian and N. African.

1. **A. Cotula,** *Linn.*; *Boiss. Fl. Orient.* iii. 315; annual, erect, pales of receptacle linear or setaceous, ray-fl. usually neuter white, disk-fl. winged dilated below, achenes caducous top naked. *Reich. Ic. Fl. Germ.* t. 1000; *Clarke Comp. Ind.* 143. Maruta Cotula, *DC. Prodr.* vi. 13.

SCIND, *Stocks, ex. C. B. Clarke* (probably Beluchistan).—DISTRIB. N. Asia, and westwards to Britain and the Canary Islands.

A glabrous or hairy fetid herb, 8–18 in. high, corymbosely branched. *Leaves* gland-dotted, segments very narrow. *Heads* 1–1½ in. diam.; peduncle slender, not thickened upwards; invol. bracts oblong, obtuse, margins scarious; receptacle conic. *Achenes* turbinate, tubercled, tip crenulate.—I have seen no Scind specimen of this, but have Beluchistan ones collected by Stocks.

2. **A. odontostephana,** *Boiss. Fl. Orient.* iii. 319; dwarf, hoary-pubescent, leaves ovate pinnatisect, segments entire or 3–5-lobed, ray-fl. ♀, pales of receptacle subulate, achenes crowned with blunt short teeth.

The PUNJAUB, at Peshawur, *Vicary, Stewart*; SCIND.—DISTRIB. Affghanistan, Beluchistan, and Persia.

Stems many from the root. *Leaves* ½–¾ in. long. *Heads* ⅓ in. diam., few-flowered; peduncle thickened upwards; invol. bracts hairy, oblong, obtuse; ligules oblong; receptacle conic. *Achenes* cylindric, ribbed, tubercled; tip of outer toothed, of inner with a short auricle.—Stated by Clarke to being found in Scind by Stocks, but probably from Beluchistan. It appears to me to be identical with *A. scaposa*, Gay.

65. ALLARDIA, *Dcne.*

Perennial, diffuse or tufted alpine herbs. *Leaves* alternate, cuneate, 3–5-toothed, or 2–3-pinnatisect. *Heads* often large, terminal, sessile or peduncled, heterogamous, rayed; ray-fl. neuter, 1-seriate, ligule spreading entire white

rosy or lilac; disk-fl. ☿, fertile, tubular, limb 5-fid. *Involucre* hemispheric; bracts ∞-seriate; margins scarious, lacerate, often black; receptacle flat, naked. *Anther-bases* truncate or with short connate auricles. *Style-arms* of ☿ broad, with truncate penicillate tips. *Achenes* of ☿ 5-angled, glabrous or glandular, of ♀ empty; pappus of rigid brown or reddish wavy flattened bristles, sometimes dilated at the tips and with split margins.—DISTRIB. Species 4 or 5, Himalayan and Central Asiatic.

1. **A. glabra,** *Dcne. in Jacq. Voy. Bot.* 88, t. 96; glabrous or sparsely woolly, leaves cuneiform 3-fid, lobes entire or toothed, heads sessile, outer invol. bracts woolly herbaceous with purple scarious margins, achenes glandular, pappus of the ray-fl. scanty of the disk copious brown, bristles slender not dilated upwards. *Clarke Comp. Ind.* 145, *excl. syn. Roylei.* A. tridactylites, *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 144. A. glabra, tridactylites, *and* Hugelii, *Schultz-Bip. in Pollichia*, xx. 442. Waldheimia tridactylites, *Kar. & Kir. in Bull. Soc. Imp. Mosc.* 1842, 126.

EASTERN and WESTERN TIBET, alt. 15–18,000 ft., from Ladak eastwards to the Sikkim frontier.—DISTRIB. Alatau Mts.

Densely tufted, strongly scented. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. long, lobes linear subacute. *Heads* 1–1$\frac{1}{2}$ in. diam., sessile; ligules broadly elliptic, $\frac{1}{2}$ in. long, purple. *Achenes* $\frac{1}{8}$ in. long; pappus $\frac{1}{3}$ in. long; bristles unequal, flat, rigid, shining, margins here and there split, tips acute.

2. **A. vestita,** *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 145; densely thickly clothed with buff or whitish wool, leaves cuneiform 3–5-fid, lobes short obtuse, heads shortly peduncled, invol. bracts membranous with broad pale brown deeply fimbriate margins, achenes glandular, pappus hairs with dilated tips yellowish.

WESTERN TIBET; Takli pass, Zanskar, alt. 15–16,000 ft., *Thomson.*

Habit and foliage of *A. glabra*, but distinguished by the dense woolly clothing, peduncled heads, which are $\frac{3}{4}$–1 in. diam., membranous invol. bracts, and the short yellowish pappus, which is not $\frac{1}{4}$ in. long.

3. **A. nivea,** *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 148; densely clothed with white appressed wool, leaves cuneiform 3-lobed or -toothed, lobes short obtuse, heads small sessile, invol. bracts woolly with narrow brown scarious margins, achenes glandular, pappus hairs with slightly dilated tips yellowish.

WESTERN TIBET, *Falconer*; Nubra, *Thomson.*

Smaller than any of the other Indian species. *Leaves* densely crowded, $\frac{1}{8}$–$\frac{1}{4}$ in. long. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; ligules few, 8–10, broadly elliptic, $\frac{1}{4}$ in. long. *Pappus* $\frac{1}{6}$ in. long, very copious.

4. **A. tomentosa,** *Dcne. in Jacq. Voy. Bot.* 87, t. 95; clothed with soft white wool, leaves oblong or linear-oblong 1–2-pinnatifid, segments various, heads peduncled, invol. bracts woolly, achenes glabrous, pappus bristles flattened with purplish often dilated tips whitish or yellowish. *Schultz-Bip. in Pollichia*, xx. 441; *Clarke Comp. Ind.* 144.

WESTERN TIBET and Tibetan passes of the WESTERN HIMALAYA, from Kashmir to Kumaon, alt 13–16,000 ft., *Falconer*, &c.

Loosely tufted; branches elongate, ascending, 4–8 in. high, naked upwards. *Leaves* 1$\frac{1}{2}$–3 in. long, variable in breadth and amount of division. *Heads* 2–3 in. diam.; ligules very many, linear, 1 in. long, entire. *Achenes* grooved and wrinkled, pale; pappus $\frac{1}{6}$–$\frac{1}{4}$ in. long.

5. **A. Stoliczkai,** *Clarke Comp. Ind.* 145; glabrous, leaves 2-pinnatisect, segments narrow, heads peduncled, invol. bracts glabrous with black scarious margins, pappus hairs connate below yellowish.

WESTERN TIBET; Ladak, *Stoliczka*; Lahul, *Jaeschke*, *Stewart*.

Habit of *A. tomentosa*, and probably a state of that plant, but quite glabrous; the heads are too young to describe.

DOUBTFUL SPECIES.

A. INCANA, *Klatt in Sitzunb. Münch. Akad.* 1878, 88, with trilobate cano-tomentose leaves, is possibly *A. vestita* or *nivea*, but the description is insufficient to identify it.

66. CHRYSANTHEMUM, *Linn.*

Perennial or annual herbs, rarely shrubs. *Leaves* alternate, entire toothed lobed or pinnatifid. *Heads* large, terminal, long-peduncled, or smaller and corymbose, heterogamous, rayed (very rarely disciform); ray-fl. ♀, 1-seriate, fertile, ligule spreading white yellow or rosy; disk-fl. ☿, fertile, tube terete or 2-winged, limb 4-5-fid. *Involucre* hemispheric or broader; bracts ∞-seriate, broad, appressed, inner with scarious tips, outer shorter often with scarious coloured margins; receptacle various, naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ with truncate penicillate tips. *Achenes* subterete or angled, variously ribbed or winged; pappus 0 or short, or a cup or auricle.—DISTRIB. Species about 80, of N. temperate regions.

Two species of *Chrysanthemum* are cultivated in Indian gardens, and indeed all over the world. One, the common garden chrysanthemum, *C. indicum*, Linn. (*Wall. Cat.* 3227; *Roxb. Fl. Ind.* iii. 436; *Clarke Comp. Ind.* 146. Pyrethrum indicum, *DC. Prodr.* vi. 62), is a plant only known in a garden state. The other, *C. coronarium*, Linn. (*DC. Prodr.* vi. 64; *Clarke Comp. Ind.* 147. C. Roxburghii, *Desf.*; *DC. l. c.* Pyrethrum indicum, *Roxb. Fl. Ind.* iii. 436. Matricaria oleracea, *Ham. in Wall. Cat.* 3229), is also only known in India in a garden state, but is a native of the Mediterranean region.

1. **C. tibeticum,** *Hook. f. & T.*; *Clarke Comp. Ind.* 147; shrubby, puberulous and viscid, branches many slender, leaves ¼–½ in. ½-pinnatifid or 2-pinnatifid, segments linear narrow acute or obtuse, heads long-peduncled, invol. bracts pubescent and viscid, margins scarious and purple, outer lanceolate acute, inner oblong obtuse, achenes subterete, pappus obscure or 0. ? Pyrethrum Roylei, *DC. Prodr.* vi. 56.

WESTERN TIBET, alt. 9–13,000 ft.; Shayuk valley, and Indus valley at Kalatza, *Thomson*.

Viscid and aromatic, 6–8 in. high; stems branching from the base; branches woody below, stiff, leafy upwards, terminating in solitary heads ½–1½ in. diam.; receptacle small, convex; ligules large, numerous, white or rosy, spreading, linear-oblong, tips entire; achenes immature.—Royle's specimens of *Pyrethrum Roylei* are very poor; they are more glabrous, the leaves are more deeply pinnatifid than Thomson's, and the heads many sessile, but I cannot separate it satisfactorily as a species.

2. **C. Stoliczkai,** *Clarke Comp. Ind.* 147; shrubby, branched from the base, pubescent and viscid, leaves ½–1 in., radical petioled, cauline sessile linear 1–2-pinnatifid, segments slender linear acute, heads long-peduncled, invol. bracts pubescent and viscid, margins scarious purple, outer lanceolate, inner oblong obtuse, achenes narrow strongly 5-ribbed, pappus a large membranous dimidiate or lobed sheath.

WESTERN TIBET; Dras, alt. 9000 ft., *Thomson*; Kargil, *Stoliczka*.

Habit of *C. tibeticum*, but the branches are longer, more slender, and less divided, the leaves more divided, the receptacle broader, the outer acute invol. bracts more numerous, and the pappus quite different, half as long as the achene. The ligules are numerous, large, spreading, and white.—*C. Griffithii*, Clarke, of Affghanistan, is very closely allied to this, and has the same pappus (which Clarke has overlooked in *C. Stoliczkai*).

3. **C. Richteria,** *Benth. in Gen. Pl.* ii. 426; dwarf, laxly villous or woolly, stock short woody much divided with many short tufted leafy branches or stems and few 1-headed slender flowering ones naked above, radical leaves petioled linear-oblong 2–3-pinnatisect, pinnæ short rounded, segments minute, cauline few sessile, invol. bracts ovate-oblong obtuse, margins scarious purple, achenes subterete, pappus a coriaceous cup lobed nearly to the base. *Clarke Comp. Ind.* 148. ? C. artemisiæfolium, *Klatt in Sitzungsb. Münd. Akad.* 1878, 88. Richteria pyrethroides, *Karel. & Kiril. in Bull. Soc. Imp. Nat. Misc.* 1842, 120. Tanacetum pyrethroides, *Schultz-Bip. in Pollichia*, xx. 441.

WESTERN TIBET; Ladak and Nubra, alt. 13–17,000 ft., *Falconer, Thomson*, &c.—DISTRIB. Soongaria.

Whole plant 6–12 in., very variable in pubescence. *Leaves* 1–3 in. long. *Heads* 1–1½ in. diam.; peduncles slender; ligules apparently white. *Achenes* many-ribbed.

4. **C. Atkinsoni,** *Clarke Comp. Ind.* 147; herbaceous, laxly woolly upwards, root tuberous, leaves oblong or linear-oblong 2–3-pinnatisect, segments very slender linear acute divaricate, heads solitary 1–1½ in. diam., invol. bracts very many linear-oblong obtuse, disk narrow green, margins scarious purple, ligules short recurved purple, achenes angular with 5 strong ribs, pappus 0.

SIKKIM HIMALAYA; Yakla and Jongri, alt. 13–16,500 ft., *Atkinson, Clarke.*

A stron ly scented herb. *Root* as thick as the thumb, short, fusiform, apparently fleshy within. *Stem* 6–12 in., solitary, rarely 2 from the root, stout, erect, leafy, terminating in a single head. *Leaves* radical, 4–6 in. long, petioled, the primary segments rather distant, ovate or rounded, alternate acute, cauline sessile. *Heads* on the thickened woolly top of the stem; ligules not longer than the involucre; receptacle convex. *Achenes* ½ in. long, narrowly obconic, pale, top crenulate, pericarp lax.—This plant very closely resembles specimens of *Tanacetum longifolium* with solitary large heads, but is distinguished by the root, the absence of shining radical petioles, and by the presence of the ray.

EXCLUDED SPECIES.

C. GRIFFITHII, *Clarke Comp. Ind.* 148, is an Affghan plant. It is very near *C. Stoliczkai*, and may be a form of that species.

67. MATRICARIA, *Linn.*

Annual or perennial herbs. *Leaves* alternate, 1–2-pinnatisect. *Heads* terminal, peduncled, solitary or corymbose, heterogamous, rayed (rarely disciform); ray-fl. ♀, fertile or sterile, ligule white elongate rarely short; disk-fl. ☿, fertile, tube terete or 2-edged, limb 4–5-fid. *Involucre* hemispheric; bracts in few series, appressed, margins usually scarious and brown, outer shorter; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ with truncate and penicillate tips. *Achenes* oblong, often incurved, faces glandular or rugulose, truncate, dorsally convex and ribbed or not, ventrally 3–5-ribbed; pappus very short, coroniform, dimidiate or 0.—DISTRIB. About 20 species, European, N. and S. African, Asiatic, and American.

1. **M. Chamomilla,** *Linn.*; *Boiss. Fl. Orient.* iii. 323; aromatic, leaves 2-pinnatifid, segments very narrow, invol. bracts with white margins, receptacle conic, achenes ribbed ventrally only, pappus 0. M. suaveolens, *Linn.*; *DC. Prodr.* vi. 51; *Roxb. Fl. Ind.* iii. 437; *Lamk. Ill.* t. 678; *Wall. Cat.* 3228; *Clarke Comp. Ind.* 149.

UPPER GANGETIC PLAIN and the PUNJAB, *Royle, Thomson.*—DISTRIB. N. Asia and westwards to the Atlantic.

Much branched. *Heads* ½–¾ in. diam., corymbose; ligules reflexed after flowering or 0, receptacle elongating during fruiting. *Achenes* small, grey; ribs slender, white.

2. **M. præcox,** *DC. Prodr.* vi. 52; annual, glabrous or pubescent, leaves pinnatisect, segments short subulate, heads radiate peduncled, invol. bracts with reddish scarious margins, receptacle conic, ligules white, achenes ribbed on both faces crowned with a lobed cup. *Clarke Comp. Ind.* 149. Pyrethrum præcox, *Bieb. Flor. Taur. Cauc.* ii. 324. Chamæmalium præcox, *Visiani*; *Boiss. Fl. Orient.* iii. 326. Gastrosulum præcox, *Schultz-Bip. Tanac.* 30. Anthemis pygmæa, *Bertoloni Misc.* ii. 237.

North-West India; Peshawar, *Vicary, Stewart.*—Distrib. Persia, Asia Minor, and the Caucasus.

So similar when dried to *Anthemis odontostephana* as to have caused them to be mixed in the herbarium.

68. COTULA, *Linn.*

Perennial or annual, often creeeping, small herbs. *Leaves* alternate, pinnatifid or pinnatisect, rarely entire or toothed. *Heads* small, peduncled, yellow, heterogamous (rarely homogamous), disciform; outer fl. ♀, 1–2-seriate, fertile, corolla conic or 0; disk-fl. ☿, fertile, tube slender or stout and 2-winged, limb 4-fid. *Involucre* hemispheric or campanulate; bracts sub-2-seriate, herbaceous or membranous, margins often scarious; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ truncate or obtuse, styles of sterile fl. sometimes entire. *Achenes* of the ray or all stipitate, compressed, nerveless or 2–4-nerved, sometimes sheathed at the top by the base of the corolla, at others with a short ear-shaped pappus.—Distrib. About 40 species, tropical and temperate.

Nearly allied to *Cotula* is *Cenia*, Juss., a S. African genus, of which one specimen of one species, *C. turbinata*, Pers., was found at Hoshiapore, in the Punjab, by Dr. Aitchison, no doubt an escape: it is a weak villous small annual, with pinnate leaves, and branches ending in a long slender peduncle with a curious top-shaped summit.

1. **C. anthemoides,** *Linn.*; *Boiss. Fl. Orient.* iii. 359; annual, hairy or glabrate, erect or diffuse, leaves 2-pinnatifid or 2-pinnatisect, segments decurrent lobed, lobes triangular-lanceolate, peduncles filiform naked, achenes of the ray broad flat. *DC. Prodr.* vi. 78; *Clarke Comp. Ind.* 149 (*excluding various habitats*). C. dichrocephala, *Schultz-Bip. in A. Rich. Fl. Abyss.* i. 419. Pleiogyne cardiosperma, *Edgew. in Trans. Linn. Soc.* xx. 71. Artemisia nilotica, *Linn.*

Gangetic Plain, from Rajmahal and Sikkim westwards to the Punjab.—Distrib. N. & S. Africa, China.

A weak diffuse weed; branches 3–9 in., spreading. *Leaves* $\frac{1}{3}$–$\frac{3}{4}$ in., petiole $\frac{1}{2}$-amplexicaul. *Heads* $\frac{1}{8}$–$\frac{1}{5}$ in. diam., solitary, terminal; fl. ♀ many; invol. bracts with scarious margins; receptacle nearly flat, tubercled. *Achenes* ovate, with thick narrow wings.

2. **C. hemisphærica,** *Wall. Cat.* 3236; annual, erect, glabrous or villous above, leaves pinnatisect, segments very numerous linear mucronate, heads solitary peduncled, ♀ fl. minute, corolla 2-toothed or 0, achenes of the ray minute not winged. *Clarke Comp. Ind.* 150, *excl. remarks.* Maruta hemisphærica, *DC. Prodr.* vi. 140; *Delesa. Ic. Sel.* iv. t. 50. Artemisia hemisphærica, *Roxb. Fl. Ind.* iii. 422.

Common in dry rice fields in Bengal, Assam, the lower and upper Gangetic Plains, and the Punjab; ascending to 2500 ft. in Garwhal.—Distrib. China.

Stem 6–8 in., branched above. *Leaves* with gashed segments, uppermost simple. *Heads* $\frac{1}{8}$ in. diam., erect in flower, inclined or drooping in fruit. *Achenes* angled.—The mucronate leaf-segments distinguish this at once from *C. anthemoides*.

3. **C. aurea,** *Linn.*; *DC. Prodr.* vi. 78; annual, prostrate, nearly glabrous, leaves 1–2-pinnatifid, segments setaceous entire or divided, heads peduncled

axillary and terminal, fl. ♀ with a flattened 3–4-toothed corolla lobed at the base, achenes of the ray hardly winged. *Clarke Comp. Ind.* 150. Matricaria aurea, *Boiss. Fl. Orient.* iii. 324. Anacyclus aureus, *Lamk. Ill.* t. 700.

The PUNJAB; Peshawar, *Stewart*.—DISTRIB. Persia, Syria, Malta, Algeria, Spain.

Habit of a *Cotula* rather than of *Matricaria*, and the achenes are decidedly flattened. *Stems* 2–4 in., decumbent from the root. *Leaves* 1–3 in., segments very slender. *Heads* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., subhemispheric; invol. bracts broadly oblong. *Corolla* lobed at the base, walls very thick below, mouth shortly 4-lobed. *Achenes* oblong, flattened, striated; pericarp mucose when moistened; pappus 0 in Indian species (a large auricle in European).

69. CENTIPEDA, *Lour.*

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, sessile on the branches or racemose, heterogamous, disciform, yellow; outer fl. ♀, ∞-seriate, fertile, corolla minute obscurely lobed; disk-fl. ☿, few, fertile, tube short, limb campanulate 4-fid. *Involucre* hemispheric; bracts 2-seriate, spreading in fruit; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ short, truncate. *Achenes* 4-angled, tip obtuse, angles hairy, hairs sometimes hooked; pappus 0.—DISTRIB. Species 3, Asiatic, Australian, and 1 tropical South American.

1. **C. orbicularis,** *Lour. Fl. Coch.*; annual, prostrate, glabrous or sparsely woolly, leaves obovate-oblong, heads globose solitary axillary subsessile, corolla of ♀ fl. a very minute cylindric tube, hairs of achenes simple. C. minuta, *Benth. in Gen. Pl.* ii. 230; *Clarke Comp. Ind.* 151. Myriogyne minuta, *Less.*; *DC. Prodr.* vi. 139. Cotula sternutatoria, *Wall. Cat.* 3259. C. minima, *Willd. Sp. Pl.* iii. 2170. Dichrocephala Schmidii, *Wight Ic.* t. 1610. Artemisia sternutatoria, *Roxb. Fl. Ind.* iii. 423. A. minima, *Linn.* Sphæromorphæa centipeda, *DC. Prodr.* vi. 140.—*Burm. Fl. Ind.* t. 58, f. 3.

Throughout the plains of INDIA and CEYLON in moist places.—DISTRIB. Affghanistan, Eastern tropical Asia, Australia, and the Pacific Islands.

Stems excessively numerous, spreading from the root, 4–8 in. long, slender, leafy. *Leaves* $\frac{1}{6}$–$\frac{1}{2}$ in. long; teeth few. *Heads* $\frac{1}{10}$–$\frac{1}{6}$ in. diam.—I see no reason for doubting that Lessing's *Myriogyne minuta* and De Candolle's *Sphæromorphæa centipeda* should be referred to Loureiro's *Centipeda orbicularis*. The genus should be placed next to *Dichrocephala*.

70. SPHÆROMORPHÆA, *DC.*

A small perennial, pubescent with crisped hairs, with woody root and prostrate rather woody branches. *Leaves* alternate, sessile, obovate. *Heads* axillary, subsolitary, shortly peduncled, heterogamous, disciform, yellow; outer fl. ♀, multiseriate, fertile, corolla elongate slender tubular inflated below; disk fl. ☿, fewer, fertile, tubular, 4-cleft. *Involucre* hemispheric; bracts many-seriate, oblong, obtuse, coriaceous, incurved in fruit; receptacle naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ and ♀ 2-fid. *Achenes* subcylindric, slender, broadly ribbed, hairy at the base only; pappus 0.

1. **S. Russeliana,** *DC. Prodr.* vi. 140; *Deless. Ic. Sel.* iv. t. 49. Centipeda orbicularis, *Clarke Comp. Ind.* 151; *Kurz in Journ. As. Soc.* 1877, ii. 179, *not of Loureiro*. Cotula Russeliana, *Wall. Cat.* 3240.

WESTERN PENINSULA; the Circars, *Russel*.—DISTRIB. Siam.

Root stout, woody, 6–10 in. long. *Stem* much branched from the woody stock; branches straggling, 6–8 in. long, flexuous, woody below. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., contracted into a petiole, obtuse, irregularly toothed. *Heads* globose, $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; invol. bracts very coriaceous, obscurely pubescent.—This is a very rare plant; I have seen no speci-

men but Wallich's. Kurz is the authority for the Siam habitat. Bentham had not seen it, or would never have confounded it with *Centipeda orbicularis* (*C. minuta*, Benth., *Myriogyne minuta*, Less.), even generically. It is, however, generically allied to that plant and to *Dichrocephala*, near which I think that both should be placed.

71. **TANACETUM,** *Linn.*

Annual or perennial herbs. *Leaves* usually pinnatisect. *Heads* corymbose (rarely large, long-peduncled, and solitary), heterogamous or homogamous, disciform, yellow; outer fl. 0 or ♀, 1-seriate, fertile, terete or compressed, 2–3-fid; disk-fl. ☿, fertile, tube stout cylindric, limb 5-fid. *Involucre* usually broad and short; bracts ∞-seriate, appressed, margins often scarious and brown, outer smaller. *Receptacle* flat or convex, naked. *Anther-bases* obtuse, entire. *Style-arms* of ☿ with truncate penicillate tips. *Achenes* compressed, 5-angled or -ribbed, or of the ray triquetrous, truncate; pappus annular or coroniform or 0, rarely a dimidiate auricle.—DISTRIB. Species about 30, north temperate regions.

* *Leaves all cauline and pinnatisect, stems or branches all flowering.*

1. **T. fruticulosum,** *Ledeb. Fl. Alt.* iv. 58; *Ic.* t. 38; hoary or woolly, stems very many from the woody root 10–14 in. strict erect leafy upwards, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. 1–2-pinnatisect, segments spreading linear obtuse, heads many peduncled or sessile $\frac{1}{4}$ in. diam., invol. bracts broadly oblong nearly glabrous all scarious and pale or margins faintly coloured, receptacle conic. *DC. Prodr.* vi. 129. Pyrethrum Athanasia, *Bess.*; *Boiss. Fl. Orient.* iii. 353.

WESTERN TIBET, alt. 12–15,000 ft., *Thomson*, &c. DISTRIB. Altai Mts., Affghanistan.

Root as thick as the thumb and less; stems rather slender. *Heads* numerous. *Achenes*, ripe not seen.—The species is easily confounded with *Artemisia fasciculata*; it differs from *T. artemisioides* in the narrower leaf-segments and glabrous involucre, from *A. gracile* in habit and the much larger heads.

2. **T. artemisioides,** *Schultz-Bip. in Herb. Hook.*; hoary-pubescent, stem 1–2 ft. slender naked below sparsely leafy ribbed simple or corymbosely branched above, leaves $\frac{1}{2}$–1 in. subpalmately 1–2-pinnatisect, segments short broad obtuse, heads $\frac{1}{4}$ in. in small corymbs terminating very long slender branches, invol. bracts broadly oblong concave coriaceous pubescent wholly pale, receptacle conical. Artemisia fasciculata, *Herb. Ind. Or. H. f. & T.*; *Clarke Comp. Ind.* 162, *not of M. Bieb.*

WESTERN TIBET; Balti, alt. 8–9000 ft., *Thomson.*

Stems sometimes simple, at others copiously branched from the base; the branches all long, slender, and sparsely leafy, both angled and ribbed, greenish grey. *Heads* sessile in a cluster, or peduncled and forming a small flat-topped or rounded corymb rarely 1 in. diam.; flowers about 20; receptacle conic. *Achenes*, ripe not seen.

3. **T. gracile,** *Hook. f. & Thoms.*; hoary-pubescent, stems many from a woody stock very slender 1–2 ft. corymbosely branched above, branches slender spreading, leaves $\frac{1}{2}$–1 in. few scattered palmately 2-pinnatisect, segments very slender, heads $\frac{1}{6}$ in. diam. in small corymbs terminating the long slender branches, invol. bracts broadly oblong scarious glabrous pale, receptacle conical, achenes obovoid with a terminal cupula. T. fruticulosum, *Clarke Comp. Ind.* 153.

WESTERN TIBET, *Falconer*; Ladak, alt. 11–12,000 ft., *Thomson*; Sutlej river, N. of Kumaon, alt. 13,500 ft., *Strach. & Winterb.*

This is very near *T. artemisioides*, but is much more slender, with slender leaf-segments and much smaller heads, with glabrous invol. bracts.

4. **T. nubigenum,** *Wall. in DC. Prodr.* vi. 130; hoary or woolly, stems

many from the woody root elongate densely leafy upwards, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. 2–3-pinnatisect, segments short linear subacute, heads many peduncled or sessile $\frac{1}{4}$–$\frac{1}{3}$ in. diam., invol. bracts broadly oblong disk herbaceous woolly margins broad scarious purple-brown, receptacle hemispheric, achenes ovoid-oblong brown 5-ribbed tip rounded. *Clarke Comp. Ind.* 153. T. fruticulosum, *var.* bracteata, *Clarke in Gard. Chron.* 1877, 584. Artemisia nubigena, *Wall. Cat.* 3233.

ALPINE HIMALAYA; from Kumaon, alt. 10–12,000 ft., to Sikkim, alt. 14–16,000 ft.

Very closely allied to *T. fruticulosum*, but the root is less woody, the stems fewer and more robust, the leaves more dissected, the heads rather larger, and the invol. bracts have coloured margins and herbaceous disks. *Flowers*, including the achenes, about $\frac{1}{12}$ in. long.—Clarke's var. *bracteata* of *T. fruticulosum* is only the weak cultivated state of this plant grown from Sikkim seeds.

5. **T. tibeticum,** *Hook. f. & Thoms.*; *Clarke Comp. Ind.* 154; dwarf, tomentose, stems very many 1–4 in. crowded on a stout stock leafy upwards, leaves $\frac{1}{2}$ in. crowded palmately pinnatisect, segments short linear obtuse, heads $\frac{1}{3}$–$\frac{1}{2}$ in. diam. capitate or corymbose, invol. bracts orbicular pubescent with broad coloured or pale scarious margins, receptacle convex or hemispheric, achenes 5-ribbed with a minute terminal cup.

WESTERN TIBET; Parang and Lanak passes, alt. 15–17,000 ft., *Thomson.*

Very near to *T. nubigenum*, and perhaps a dry country form of that plant; but the habit is different, the heads often much larger, and the receptacle never conical; the corollas seem to be always glandular, and the whole plant is probably strongly scented when fresh. *Flowers*, including the achenes, $\frac{1}{12}$ in. long. Specimens collected by Thomson in the Parang valley have solitary heads $\frac{2}{3}$ in. diam.

6. **T. tenuifolium,** *Jacquem. in DC. Prodr.* vi. 129; dwarf, silkily tomentose, stems many short 2–4 in. densely leafy, leaves 2-pinnatisect, segments linear obtuse, heads $\frac{1}{6}$–$\frac{1}{4}$ in. corymbose, invol. bracts linear-oblong hoary margins scarious brown, receptacle convex, achenes obovoid acutely angled. Artemisia tenuiflora, *Jacquem. Cat.* 2053; *Bess. Suppl. ad Tent. Abrot.* 62.

WESTERN TIBET; Keyrie Pass, *Jacquemont*; Kumaon, alt. 14,000 ft., *Thomson.*

Very near indeed to *T. tibeticum*, and probably a variety of that plant, differing chiefly in the narrow lobes of the more silkily pubescent foliage. *Flowers*, including the achenes, $\frac{1}{10}$ in. long.

** *Leaves radical and cauline; stems many from the root, elongating and flowering, the rest short and flowerless, or stem subsolitary with both radical and cauline leaves.*

7. **T. senecionis,** *Gay in DC. Prodr.* vi. 129; tomentose or woolly, stems few or many stout long or short from a stout woody root, radical leaves petioled 1–3 in. palmately pinnatisect, segments short or long linear obtuse, flowering stems 3–10 in. distantly leafy, heads $\frac{1}{4}$–$\frac{1}{5}$ in. diam. capitate or in woolly corymbs, invol. bracts broadly ovate with a woolly disk and broad scarious brown margins, receptacle convex or hemispheric, achenes obovoid tip rounded without a cupula. T. tomentosum, *DC. l. c.* 130.

WESTERN HIMALAYA; Lahul, Kunawur, and Garwhal, alt. 11–14,000 ft., *Royle, Jacquemont*, &c.

Very variable, 4–10 in. high. In Jacquemont's specimen the leaves are 3 in. long and the flowering stem 8 in., but at great elevations the plant becomes dwarf and only 3–5 in. high. I have seen no quite ripe achenes, but the ripest appear to be between obovoid and cuneate, rather compressed, angled, with rounded shoulders and no trace of a terminal cupule (as in *T. nubigenum*); pericarp lax. I find no difference whatever between some of Jacquemont's specimens of *T. senecionis*, so named by Gay, and Royle's of *tomentosum*. The heads vary in woolliness, the invol. bracts being some-

times almost hidden (as in the following species), and their brown scarious edges concealed. The flowers (with the achenes) rarely exceed ¼ in. long.

8. **T. robustum,** *H. f. & T.*; *Clarke Comp. Ind.* 154; very stout, softly tomentose, stem subsolitary from a stout woody stock robust angled, radical leaves long-petioled 3–4 in. oblong in outline 2-pinnatisect, segments linear-obovoid obtuse, cauline few, heads ½ in. diam. in branched corymbs with very stout woolly and leafy branches and peduncles, invol. bracts densely woolly oblong with very narrow scarious pale margins, receptacle convex, flowers numerous.

WESTERN HIMALAYA; Kunawur, below the Werang Pass, *Thomson.*

I doubt this being anything but a very large robust form of *T. senecionis*, with very stout stem and branches of the corymbs, larger heads, and woolly bracts. *Root* woody, with a prostrate, branched crown. *Leaves* long-petioled, ¾–1 in. diam. *Achenes* unripe, but apparently as in *T. senecionis*, with the corolla ⅕ in. long.

9. **T. Falconeri,** *Hook. f.*; rather silkily tomentose or hoary, stem 1–2 ft. robust grooved, radical leaves 2–4 in. linear-oblong in outline 2-pinnatisect, segments linear narrow acute, heads ⅓ in. diam. peduncled in branched corymbs with linear or divided leaves, invol. bracts densely pubescent linear-oblong margins narrowly scarious pale, receptacle convex, flowers about 20.

WESTERN TIBET (or Kashmir), *Falconer*; KASHMIR, *Bellew.*

A very robust tall species, differing from *T. robustum* in the larger size, the longer leaves more oblong in outline, with slender lobes. *Achenes* pale, linear-oblong, rather dilated upwards, pericarp loose, tip truncate and lobed, with the corolla about ¼ in. long. In Bellew's specimen the corymb is 6 in. diam., with long stout ascending branches, the lower 7–8 in. long; the heads are longer peduncled, and the leaves on the corymb simple, slender, undivided, and 1 in. long. In Falconer's the corymbs are much smaller and denser, with divided leaves.

10. **T. longifolium,** *Wall. Cat.* 3231; laxly villous, stem single from the root stout 6–18 in., radical leaves 5–10 in. slender linear in outline 2-pinnatisect, segments subfiliform, heads ⅓–½ in. diam. in a close woolly corymb or rounded cluster (rarely solitary and 1 in. broad), invol. bracts narrowly oblong with a pubescent disk and broad scarious purple margins, receptacle hemispheric, flowers 50–60. *DC. Prodr.* vi. 130, *excl. syn.*; *Clarke Comp. Ind.* 154.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 10–13,500 ft.

A very distinct species in foliage, though offering no characters of importance in the head and flowers. *Root* as thick as the thumb, woody, crowned with the shining base of the old petioles. *Stem* stout, erect, striated, not angled. *Leaves* very long and finely cut. *Heads* sometimes reduced to one, then 1 in. diam., with very many invol. bracts; flowers with the achenes, ¼ in. long. *Achenes* narrowly obovoid, with 5 strong ribs; pappus 0.—The form with a large solitary head is rather an abnormal development than a normal variety, and, except in the absence of ligules and presence of the shining remains of the petioles, it resembles most closely *Chrysanthemum Atkinsoni.*

11. **T. nanum,** *Clarke Comp. Ind.* 155; hoary, rootstock excessively stout branched, radical leaves ½–1 in. ovate 2-pinnatisect, segments minute short acute incurved, flowering stem 3 in. sparingly leafy simple, heads capitate ⅓ in. diam., invol. bracts with a woolly disk and broad brown scarious margins, receptacle convex.

WESTERN TIBET; Nubra Valley, alt. 16,000 ft., *Thomson.*

This differs from all the other Indian species in the minute incurved segments of the leaves, which are quite acute; the heads resemble those of *T. nubigenum*, but the habit is very different. The woody root is almost as thick as the thumb, the achenes are immature.

*** *Leaves cuneiform, 3-fid.*

12. **T. gossypinum,** *Hook. f. & T.*; *Clarke Comp. Ind.* 154; dwarf, densely tufted, softly woolly, leafy shoots short densely compacted clothed with short quadrate silky most densely imbricating leaves $\frac{1}{8}$ in. long, flowering stems 1-2 in. stout simple densely leafy with cuneiform 3-fid leaves $\frac{1}{4}$–$\frac{1}{3}$ in., heads $\frac{1}{4}$ in. diam. in rounded terminal woolly dense clusters, invol. bracts linear-oblong, margins scarious purple, receptacle hemispheric.

SIKKIM HIMALAYA, on the Tibetan frontier, alt. 16–18,000 ft., *J. D. H.*

A very singular species, forming dense cushions, at the highest elevation reached by flowering plants in Sikkim, resembling one of the moss-like *Eritrichiums* in habit. The short flowerless shoots have often silvery white silky pubescence, which contrasts with the tawny wool of the flowering branches, which are club-shaped, the dense inflorescence forming the broad end of the club. The achenes are narrowly obovoid, with a lax pericarp and small cupular tip, and with the corollas are $\frac{1}{6}$ in. long.

72. ARTEMISIA, *Linn.*

Herbs or shrubs, usually strong-scented. *Leaves* alternate, entire serrate or 1–3-pinnatisect. *Heads* small, solitary or fascicled, racemose or panicled, never corymbose, heterogamous or homogamous, disciform; outer fl. ♀, 1-seriate, fertile, very slender, 2–3-toothed; disk fl. ☿, fertile or sterile, limb 5-fid. *Involucre* ovoid, subglobose or hemispheric; bracts few-seriate, outer shorter, margins scarious; receptacle flat or raised, naked or hirsute. *Anther-bases* obtuse, entire. *Style-arms* of ☿ with truncate usually penicillate tips, often connate in the sterile fl. *Achenes* very minute, ellipsoid oblong or subobovoid, faintly striate; pappus 0.—DISTRIB. Species about 150, in the N. temperate regions, and a few S. American ones.

SECT. I. **Dracunculus.** *Heads* heterogamous; outer fl. ♀; disk fl. ☿, sterile; receptacle naked. *Leaves* glabrous or villous, never appressedly tomentose.

* *Perennials.*

1. **A. salsoloides,** *Willd.*; *Boiss. Fl. Orient.* iii. 262; perennial, glabrous or sparsely villous, stems many strict angled pale shining, leaves glaucous 2–3-pinnatisect, segments slender obtuse or acute, upper quite entire, racemes simple or paniculately branched, heads $\frac{1}{8}$–$\frac{1}{6}$ in. long subsessile or pedicelled broadly ovoid or subglobose, invol. bracts glabrous ovate or obovate-oblong obtuse pale with broad scarious margins, achenes glabrous. *DC. Prodr.* vi. 94.; *Ledeb. Fl. Ross.* ii. 560; *Clarke Comp. Ind.* 157.

WESTERN TIBET, alt. 12-14,000 ft., from Rupchu (N. of Kumaon) westwards.—DISTRIB. Mongolia, Siberia, Caucasus.

Root very stout, long and woody, sometimes 12 in. *Leaves* 1–2 in., radical many or 0. *Racemes* copious. *Heads* shining; flowers very few. *Achenes* 2–3, narrowly ellipsoid, $\frac{1}{20}$ in. long, delicately ribbed.—Clarke describes this species as biennial, but the root appears to be perennial.

VAR. 1. *salsoloides proper*; stems very numerous from the crown, racemes subsimple.

VAR. 2. *paniculata*; taller, stem stout branched above the root, racemes panicled. A. Halimodendron, *Ledeb.*; *Herb. Ind. Or. H. f. & T.* (*not of Turczaninow*, which has much larger more ovoid heads $\frac{1}{5}$ in. long, with longer hard invol. bracts, and achenes twice as large).

2. **A. Dracunculus,** *Linn.*; *DC. Prodr.* vi. 97; herbaceous, perennial, glabrous, radical leaves 3-fid or 0, cauline sessile linear or linear-oblong acute entire or toothed, racemes panicled, heads subglobose $\frac{1}{8}$ in. diam. sessile or pedi-

celled pale shining, invol. bracts broadly oblong with very broad scarious margins and a very narrow green disk. *Clarke Comp. Ind.* 157; *Ledeb. Fl. Ross.* ii. 563.

WESTERN TIBET, alt. 14–16,000 ft., *Thomson*; Lahul, *Jaeschke.*—DISTRIB. Affghanistan, W. Asia, S. and Mid Russia.

A green erect herb 1–2 ft. high; stems grooved and ribbed. *Leaves* 1–1½ in., quite entire in Indian specimens. *Heads* sometimes clustered in threes, horizontal or nodding; flowers rather numerous. *Achenes*, ripe not seen in Indian specimens.—Though described as an annual, the roots seem to be perennial. The Affghan specimens have rather smaller heads, and are probably Boissier's *A. campestris*, var. *inodora.*

3. **A. glauca,** *Pall.*; *DC. Prodr.* vi. 97; herbaceous, perennial, pubescent, radical leaves 3-fid or 0, lobes acute, cauline sessile linear or linear-lanceolate rarely lobed, heads subglobose ⅛ in. diam. in very slender lax short racemes with capillary pedicels, invol. bracts glabrous oblong obtuse scarious with a narrow green disk. *Ledeb. Fl. Ross.* ii. 563. A. dubia, *Wall.*? *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; Kunawru and Jamu, alt. 7–9000 ft., *Thomson.*—DISTRIB. Siberia, Mongolia.

Very similar to *A. Dracunculus*, and distinguished by the pubescence only.

4. **A. desertorum,** *Spreng. Syst.* iii. 490; herbaceous, perennial, glabrous, leaves 1–2 in. sessile entire and linear or 2–3-partite or pinnatifid with linear acute segments, heads usually pedicelled subglobose ⅛ in. diam. sessile or peduncled, solitary and distant or in clusters of 2–3 short forming panicled racemes, invol. bracts orbicular or oblong, outer herbaceous or with narrow scarious margins. *DC. Prodr.* vi. 97; *Ledeb. Fl. Ross.* ii. 564; *Clarke Comp. Ind.* 158. A. fœtida, *Jacquem. in DC. Prodr.* vi. 98. A. Jacquemontiana, *Besser*; *DC. l. c.* 97.

WESTERN TIBET and KUNAWUR, alt. 10–16,000 ft., *Falconer, Jacquemont, Thomson.* —DISTRIB. Eastern Turkestan, alt. 17–18,000 ft. (*Henderson*); Siberia.

A suberect fœtid herb; branches grooved and ribbed. *Leaves* green, acute. *Heads* dark green; outer invol. bracts often wholly herbaceous; flowers rather numerous. *Achenes* as in *A. salsoloides.*—In *A. Jacquemontiana* the invol. bracts are more scarious, and present a transition to *A. Dracunculus*, of which this is probably a variety; it is referred by Maximovicz (Dec. xi. 526) to *parviflora*, Roxb., but I think erroneously.

5. **A. parviflora,** *Roxb. Hort. Beng.* 61; *Fl. Ind.* vi. 420; perennial, herbaceous, villous, hoary or glabrous, stems erect or ascending stout paniculately branched grooved, leaves sessile linear-cuneate, tip entire or acutely 2–8-fid or flabellately lobulate rarely pinnatifid, upper linear entire acute, heads $\frac{1}{10}$–⅛ in. diam. globose secund in elongate strict panicled racemes, invol. bracts broadly oblong with broad scarious edges. *Don Prodr.* 181; *DC. in Wight Contrib* 20; *Prodr.* vi. 100; *Dalz. & Gibs. Bomb. Fl.* 314; *Wall. Cat.* 3298; *Clarke Comp. Ind.* 159. A. glabrata, *DC. in Wight Contrib.* 20; *Prodr.* vi. 100; *Wight Ic.* t. 1111. A. cuneifolia, *DC. l. c.* 126.

TEMPERATE HIMALAYA; from Kashmir, alt. 7–9000 ft., to Sikkim, alt. 7–11,000 ft. KHASIA MTS., AVA, and MARTABAN, alt. 5–7000 ft. BEHAR; on Parusnath, alt. 4000 ft. WESTERN GHATS; from the Concan southwards to the Pulney Mts. (absent in Ceylon).

A shrubby inodorous herb 1–3 ft. high, glabrous or laxly villous. *Leaves* very variable, 1–2 in. long, the lowest sometimes nearly 1 in. diam., with palmately spreading 3–5-fid lobes, the upper middle sometimes 1–2-pinnatifid with narrow lobes, but usually the lower and middle cauline are simply narrowly cuneate and acutely 3–5-fid at the broad end; all have generally a pair of stipule-like narrow lobes at the base. *Heads* almost always pedicelled, greenish; flowers 6–10. *Achenes* about $\frac{1}{60}$ in. long, ellipsoid, smooth, brown.—The stems are so robust as to suggest that this is often

shrubby, though described as herbaceous by Roxburgh. The corolla of the ray is not pubescent, as represented in Wight's Icones.

** *Annuals, rarely perennials.*

6. **A. scoparia,** *Waldst. & Kit. Pl. Rar. Hung.* i. 66, t. 65; annual, or rootstock perennial, glabrous below, hoary or villous, radical leaves petioled broadly ovate 1–3-pinnatisect, segments linear, cauline filiform, heads minute $\frac{1}{12}$–$\frac{1}{10}$ in. secund in slender panicled racemes, invol. bracts glistening oblong obtuse scarious with narrow green disks. *Boiss. Fl. Orient.* iii. 364; *Ledeb. Fl. Ross.* ii. 569; *Clarke Comp. Ind.* 158. A. elegans, *Roxb. Fl. Ind.* iii. 421; *Wall. Cat.* 4300. A. trichophylla, *Wall. Cat.* 3305; *DC. l. c.* vi. 100; *Clarke l. c.*

UPPER GANGETIC PLAIN, and westwards to SCIND and the PUNJAB. WESTERN HIMALAYA; from Kashmir to Lahul, alt. 5–7000 ft. WESTERN TIBET, alt. 7–12,000 ft., *Thomson.*—DISTRIB. Japan, Affghanistan to Central Europe.

A faintly scented very slender branched annual, 1–2 ft. high; branchlets often almost capillary. *Leaves*, radical 1–3 in., long-petioled, the segments distant spreading; cauline setaceous. *Heads* sessile or on short capillary pedicels. *Achenes* $\frac{1}{60}$ in. long (perhaps one of the most minute fruits of any flowering plant).—Though usually annual and described as such, some specimens, both from the plains of India and Tibet, have very woody stocks.

7. **A. stricta,** *Edgew. in Trans. Linn. Soc.* xx. 73; annual, laxly villous or glabrate, erect or branches diffusely prostrate, radical leaves petioled 1–3-pinnatisect, segments linear or lanceolate, cauline sessile less divided or entire, heads $\frac{1}{10}$–$\frac{1}{8}$ in. diam. subglobose sessile in spiked clusters or solitary suberect, invol. bracts oblong obtuse pubescent, outer greenish with narrow scarious margins glabrous and shining in age. *Clarke Comp. Ind.* 158.

Tibetan Passes of the HIMALAYA; Kumaon, alt. 10–11,500 ft., *Edgeworth, Strach. & Winterb.* SIKKIM, alt. 15,000 ft., *J. D. H.* WESTERN TIBET, alt. 10–13,000 ft., *Thomson.*

Very variable; from a diffuse herb with spreading prostrate branches 2–6 in. long, to a tall branching one 2 ft. high, readily distinguished from *A. scoparia* by the smaller less divided radical leaves, the shorter pinnatisect cauline ones, and the usually pubescent larger heads being sessile, erect or suberect, and forming very short spikes, and being not at all secund. The achenes are also larger than in that plant.

8. **A. annua,** *Linn.*; *Boiss. Fl. Orient.* iii. 371; annual, erect, very slender, glabrous, branches deeply grooved, leaves broad 3-pinnatisect or decompound, segments serrate or lobulate, heads $\frac{1}{12}$–$\frac{1}{10}$ in. diam. subglobose secund in very slender panicled racemes pedicelled pendulous, invol. bracts glabrous, inner orbicular green with scarious margins at length all scarious and shining. A. Stewartii, *Clarke Comp. Ind.* 163. A. Wadei, *Edgew. in Trans. Linn. Soc.* xx. 72.

The PUNJAB; Peshawur to Wuzuristan, alt. 5500 ft., *Stewart.*—DISTRIB. Siberia, Affghanistan, and westwards to Hungary.

A very strong scented species. It has 4-pinnatifid lower leaves, 3 in. broad, and as long, with stipuliform pinnatifid auricles at the base of the petiole, and with puberulous nerves beneath. Stewart's specimens are tall, strict, copiously paniculately branched, with fully developed leaves deltoid-ovate in outline, identical with Edgeworth's, and both with Siberian and Caucasian specimens of *A. annua.* Though usually placed in the section *Abrotanum*, I find the ray flowers to be always fertile and the disk flowers sterile.

SECT. II. **Seriphidium.** *Heads* homogamous; flowers all fertile, receptacle naked.

9. **A. maritima,** *Linn.*; *Ledeb. Fl. Ross.* ii. 570; hoary or tomentose,

shrubby below, stems erect or ascending much branched from the bases, leaves ovate 2-pinnatisect, segments small spreading linear obtuse, upper simple linear, heads 3-8-fld. ovoid or oblong suberect in spicate fascicles, invol. bracts linear-oblong, outer herbaceous tomentose, inner scarious acute glabrous. *DC. Prodr.* vi. 102; *Clarke Comp. Ind.* 159. A. brevifolia, *Wall. Cat.* 3306; *DC. Prodr.* vi. 103. A. fragrans, *Willd.*; *Boiss. Fl. Orient.* iii. 366. A. acetica, *Jacq. in Bess. Monog. Dracunc. Suppl.* 86; *DC. l. c.* 105.

Western Himalaya; from Kashmir to Kumaon, alt. 7-9000 ft. Western Tibet; in salt plains, alt. 9-14,000 ft., abundant. Distrib. Coasts of Europe and saline tracts of N. Asia.

Rootstock woody, branched; stems 6-18 in., strict, woody or wiry. *Leaves* ½-2 in., often quite white, with very many segments; petiole slender. *Heads* often reddish, crowded and bracteolate by a small linear or almost setaceous leaf.—The heads are erect in most of the Indian specimens, which refers them to the form called *fragrans* of Willdenow, but Clarke mentions a variety with nodding heads which he (in mss.) refers to *A. nutans*, Willd.; and he has a var. *Thomsoniana* for a form with very woolly leaves and suberect heads (*A. Lehmaniana*, Bge.). Wallich's *A. brevifolia* in no way differs from *A. maritima*.

Sect. III. **Abrotanum.** *Heads* heterogamous; ray-fl. ♀, disk-fl. ⚥, all fertile; receptacle naked (or puberulous in *A. persica*).

* *Annuals or biennials.*

10. **A. caruifolia,** *Ham. in Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 162 (*by error carnifolia*); annual, quite glabrous, stem branched above densely leafy, leaves sessile capillaceo-multifid, heads ⅛-⅙ in. diam. hemispheric pedicelled secund drooping in axillary leafy racemes, invol. bracts glabrous broadly oblong, outer herbaceous with narrow scarious margins, inner scarious. *Wall. Cat.* 3299; *DC. Prodr.* vi. 119; *Clarke Comp. Ind.* 162. A. riparia, *Herb. Ham.*

Eastern Bengal, Assam, Nipal and Birma.—Distrib. China.

Stem 2-4 ft., stout, but soft and herbaceous. *Leaves* deep green, segments very narrow and weak. *Heads* green, many-fld.; receptacle hemispheric.

11. **A. Tournefortiana,** *Reichb. Ic. Exot.* i. 6, t. 5; annual, stout, erect quite glabrous simple or thyrsoidly branched, leaves linear-oblong or ovate pinnatisect, rachis lobulate, segments distant oblong toothed laciniate or pinnatifid, cauline and floral sessile elongate, heads ovoid ⅛ in. long erect in very dense axillary erect sessile compound thyrsoid panicles, invol. bracts glabrous erect after flowering obovate-oblong acute scarious with a narrow green disk, receptacle very small. *DC. Prodr.* vi. 119; *Boiss. Fl. Orient.* iii. 372; *Clarke Comp. Ind.* 163.

Western Himalaya and Western Tibet; alt. 8-12,000 ft; Kashmir, *Falconer*; Kunawur and Piti, *Jacquemont*, *Thomson*.—Distrib. Affghanistan and westward to Armenia.

Very stout, 2-4 ft.; stem green or purplish. *Leaves* green, 3-5 in. long, soft, petiole and rachis slender. *Heads* clustered like the inflorescence of an *Amaranthus*. *Achenes* larger than usual in the genus, about $\frac{1}{30}$ in. long.—The Sikkim plant referred to this by Clarke (l. c.) is *A. biennis*, which differs widely in the size, form and colour of the heads, and in the broad receptacle.

12. **A. biennis.** *Willd.*; *Ledeb. Fl. Ross.* iii. 593; green and rather succulent, glabrous or pilose, leaves 2-pinnatipartite, segments pinatifid or toothed, heads many-fld. ⅕-⅓ in. diam. broadly cupular suberect in short leafy panicled racemes, invol. bracts pubescent broad green with rather narrow and brown scarious margins, *DC. Prodr.* vi. 120.

Western Tibet; Milam (N. of Kumaon), alt. 11,500 ft., and Topidunga, alt.

15,000 ft., *Strach. & Wint.*; Potopa, alt. 11,500–12,000 ft., *Heyde.* SIKKIM; on the Tibet frontier, alt. 15,000 ft., *J. D. H.*—DISTRIB. N. Asia, N. America.

A subsucculent herb, of which the specimens are not very good. *Stem* 6–12 in., very stout and soft. *Leaves* radical, numerous, green, petioled, cauline subsessile, 1–2 in., linear-oblong in outline. *Heads* much larger than those in any of the foregoing species.—Ledebour describes the root, which I have not seen, as creeping jointed and scaly, the brown scarious margins of the invol. bracts are peculiar.

** *Perennials with usually small heads in often spreading panicled spikes or racemes.*

13. **A. amygdalina,** *Dcne. in Jacq. Voy. Bot.* 92, t. 100; stem stout erect leafy, leaves subsessile lanceolate acuminate serrate teeth incurved gland-tipped hoary beneath, heads $\frac{1}{10}$ in. ovoid few-fld. subsecund in dense short axillary racemes, invol. bracts oblong obtuse scarious glabrous, outer with a green disk.

KASHMIR; Pir Punjal, *Jacquemont, Stewart.*

Stem deeply grooved and many-ribbed, glabrous. *Leaves* quite simple, 4–6 by $\frac{1}{2}$–$1\frac{1}{4}$ in., rather membranous, glabrous above; nerves many and midrib slender; base narrowed into a very short petiole with minute setaceous auricles.—I have seen but one specimen of this very remarkable species, the leaves are like those of a willow. It is perhaps nearest *A. vulgaris*; the only other species at all like it is *A. anomala*, Hance, of China, which has shorter, broader leaves.

14. **A. vulgaris,** *Linn.*; *Boiss. Fl. Orient.* iii. 371; tall, shrubby below, hoary pubescent or tomentose, stems leafy paniculately branched, leaves large ovate lobed laciniate or 1–2-pinnatipartite white-tomentose beneath rarely hoary or green on both surfaces, lobes acute irregularly serrate or lobulate lower petioled upper sessile or petioled with stipule-like basal lobes, uppermost linear-lanceolate entire, heads $\frac{1}{8}$–$\frac{1}{6}$ in. long ovoid or subglobose clustered or seriate subsecund in short or long suberect or horizontal panicled racemes, invol. bracts woolly or glabrate, outer small herbaceous, inner almost wholly scarious, corollas glabrous. *DC. Prodr.* v. 112; *Clarke Comp. Ind.* 161; *Roxb. Fl. Ind.* iii. 420; *Kurz in Journ. As. Soc.* 1877, ii. 178. A. indica, *Willd.*; *DC. l. c.* 114; *Roxb. l. c.* 419; *Dalz. & Gibs. Bomb. Fl.* 129; *Wight Ic.* t. 1112; *Wall. Cat.* 3293. A. dubia, *Wall. Cat.* 3307; *DC. l. c.* 110. A. myriantha, *Wall. Cat.* 3297; *DC. l. c.* 112. A. paniculata, *Roxb. l. c.* 418. A. leptostachya, *DC. l. c.* 113. A. grata, *Wall. Cat.* 3294 *in part*; *DC. l. c.* 114. A. lavandulæfolia, *DC. l. c.* 110. A. affinis, *Hassk. Hort. Bogor.* 102. A. parviflora, *Wight Cat.* 1460, *not of Roxb.*; *Rheede Hort. Mal.* x. t. 45.

Throughout the mountainous districts of INDIA, at elevation of 5–12,000 ft., in the Western Himalaya; and 5–8000 ft. in Sikkim, the Khasia, Ava, and Martaban Mts. Mt. Aboo, in MARWAR. The WESTERN GHATS, from the Concan, southwards to CEYLON.—DISTRIB. Temperate Europe and Asia, Siam, Java.

A tall aromatic shrub-like herb, often forming thickets 6–8 ft. high in Sikkim, with branches as thick as the thumb, and leaves 7 in. long, and broad; the leaves normally vary from very lobulate, like those of the garden chrysanthemum, to pinnatifidly 2–3-sect, and from green or hoary on both surfaces to thickly clothed with white or buff, tomentose beneath or on both surfaces; the heads, too, vary greatly in number, disposition, size and form, from globose to ovoid, and from sessile to pedicelled.—I have failed to separate the following forms into varieties recognisable by description or by locality. *A. indica* was originally distinguished by its leaves ashy beneath; *A. dubia* by the more entire leaves; *A. myriantha* by its floribund branches; *A. paniculata* (a Calcutta garden plant) has no distinctive characters; *A. leptostachya* should have leafless racemes, as is often the case with other forms; *A. grata* of Wallich consists of a broad leaved state of *vulgaris* from the Western Peninsula, and of the same with *A. Roxburghiana* from the Calcutta Garden. The

synonym of *parvifolia*, Wight, is probably due to a misplaced ticket. Wight (Icones, under t. 1112) states that he cannot recollect having seen this plant (in the Nilgherry Mts.) except about habitations; and the only habitat Thwaites gives for it in Ceylon is "in or near native gardens." It is, however, abundant in the Ghats, and the heads are sold in the Bombay Bazaar.

15. **A. Roxburghiana,** *Besser Abrot. Suppl.* 57: rootstock creeping, stem 1–2 ft. simple below ascending leafy, leaves ovate or oblong 2–3-pinnatifid, rachis winged, segments linear or oblong acute entire or cut tomentose or glabrate beneath margins flat or recurved, heads $\frac{1}{8}$ $\frac{1}{6}$ in. ovoid or hemispheric 6–10-fld. in compound pannicled racemes or spikes, invol. bracts pubescent or tomentose, receptacle very small flat. *DC. Prodr.* vi. 114. A. Wallichiana, *Besser Abrot.* 69.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–10,000 ft.

Very similar in some states, in foliage and inflorescence, to *A. vulgaris*, but at once distinguished by its rootstock, small size, and herbaceous habit; the leaves, too, are much smaller and more finely cut, the flowers are usually, if not always, purple. The heads vary much in size and in form, from hemispheric to ovoid. A form with large racemose heads appears to pass into *A. Moorcroftiana.*

VAR. 1. *grata*; leaf segments broad white tomentose beneath, margins flat or recurved. A. grata, *Wall. Cat.* 3294, A. A. hypoleuca, *Edgew. in Trans. Linn. Soc.* xx. 71; *Clarke Comp. Ind.* 164. The stem is often purple.

VAR. 2. *purpurascens*; leaves more finely cut, segments very narrow acute, margins recurved glabrate on both surfaces. A. purpurascens, *Jacquem. mss. Besser l. c.* 60. A. revoluta, *Edgew. l. c.* 72.

16. **A. vestita,** *Wall. in DC. Prodr.* vi. 106; *Cat.* 3301; shrubby below, erect, hoary, paniculately branched, leaves ovate pinnatisect segments pectinately pinnatifid green above white-tomentose beneath, rachis simple or pectinately winged, heads 6–10-fld. hemispheric $\frac{1}{8}$–$\frac{1}{6}$ in. subsecund long-pedicelled nodding in short or long compound hoary racemes, invol. bracts obovate-oblong scarious, outer with a green disk. *Clarke Comp. Ind.* 160.

WESTERN HIMALAYA, and the SALT RANGE, alt. 7–10,000 ft., from Peshawur and Kashmir to Kumaon.—DISTRIB. N. China.

Stem 1–4 ft., hoary, grooved. *Leaves* 1–3 in., petiole slender or 0, with or without simple or pinnatifid basal auricles. *Achenes* ellipsoid, smooth, shining, brown. The very finely divided leaves, like those of a fern, distinguish this from *A. Roxburghiana*, to which it is most closely allied.

17. **A. laciniata,** *Willd.*; *DC. Prodr.* vi. 110; erect, hoary, herbaceous, leaves broadly ovate decompoundly pinnatisect, segments pectinately pinnatifid puberulous on both surfaces, rachis simple, heads 15–20-fld. broadly hemispheric nodding subsecund distant in slender panicled racemes, invol. bracts hoary with a green disk and broad scarious margins. *Ledeb. Fl. Ross.* ii. 581; *Clarke Comp. Ind.* 161.

WESTERN TIBET and KUMAON, alt. 8–12,000 ft., *Royle*, &c. KASHMIR, alt. 9500 ft., *Clarke.*—DISTRIB. Siberia and Dahuria.

This is probably only a more compound leaved state of *A. sacrorum*; the heads are identical.

18. **A. sacrorum,** *Ledeb. Fl. Alt.* iv. 72; *Fl. Ross.* ii. 578; erect, hoary, shrubby below, leaves long-petioled ovate pinnatisect, segments pectinately pinnatifid hoary or green or white-pubescent on both surfaces, rachis simple or pectinately winged, heads 15–20-fld. broadly hemispheric nodding subsecund distant in slender panicled racemes, invol. bracts hoary, outer with a green disk and broad scarious margins. *Reichb. Ic. Fl. Germ.* t. 310; *Clarke Comp.*

Ind. 160. A. Messerschmidiana, *Besser Monog.*; *Abrot.* 27; *DC. Prodr.* vi. 107.

WESTERN TIBET, KUNAWUR, and the Tibetan region of KUMAON, alt. 9–17,000 ft. —DISTRIB. Mid. and S. Russia, Siberia, Dahuria.

Habit of *A. vestita*, but the leaves are smaller and alike on both surfaces, the heads are twice as large, and the flowers far more numerous. The outer invol. bracts in both are sometimes linear and green.

19. **A. Campbellii,** *Hook. f. & T.*; *Clarke Comp. Ind.* 164 (*excl. locality of W. Tibet*); dwarf, clothed with buff tomentum, stems simple, ascending from a creeping woody branched stock, leaves ovate pinnatisect segments 2–3-lobed, lobes lanceolate acute tomentose on both surfaces, petiole stout, heads $\frac{1}{6}$ in. diam. hemispheric sessile clustered clusters in interrupted simple or racemose spikes, invol. bracts densely woolly oblong, outer with narrow scarious margins, inner scarious.

SIKKIM HIMALAYA; on the Tibetan passes and north of them, alt. 16–18,000 ft., *J. D. H.*

A strong scented, tufted, stout herb, less than a foot high, softly, often subsilkily tomentose all over; rootstock stout, with stout woody descending fibres. *Radical leaves* 1–1$\frac{1}{2}$ in. long; petiole stout, with a sheathing base; cauline sessile, with auricled bases, segments with revolute margins. *Heads* brown, in woolly clusters; receptacle very small; flowers not numerous.—Through some accident Clarke has referred to this species a Western Tibetan plant of Falconer's, &c., and a portion of Wallich's N. 3302 (*A. vestita*), from Kashmir.

*** *Perennials with rather large heads in simple or sparingly branched erect axillary and terminal racemes.*

(The species 20, 21, 22 are very closely allied and closely resemble states of 16, 17 and 18, all may prove forms of one or two species.)

20. **A. Moorcroftiana,** *Wall. Cat.* 3296; *DC. Prodr.* vi. 117; hoary or tomentose, rootstock creeping, stem simple below, leaves ovate or oblong 2-pinnatifid white-tomentose beneath, rachis pinnatifid, segments spreading ovate or lanceolate acute, heads large $\frac{1}{6}$–$\frac{1}{4}$ in. diam. broadly hemispheric 15–20-fld. sessile solitary or in clusters along the long racemes, invol. bracts obovate tomentose broadly scarious, receptacle broad hemispheric.—A. hypoleuca? *Herb. Ind. Or. H. f. & T.*

KASHMIR; Baltal, alt. 9–13,000 ft., and WESTERN TIBET, alt. 13–14,000 ft., *Thomson.* KUNAWUR, at Spiti, *Jaeschke.*

This resembles closely states of *A. Roxburghiana*, var. *grata*, in foliage, and it has a similar root, but the inflorescence is very peculiar, the large heads forming interrupted elongated spikes or racemes, with spaces of $\frac{1}{4}$–$\frac{3}{4}$ in. between the solitary heads or clusters of 2–3 heads. The flowers are purple, very numerous, the receptacle totally different, and the achenes twice as large ($\frac{1}{24}$ in. long).

21. **A. persica,** *Boiss. Fl. Orient.* iii. 373; tall, erect, perennial?, hoary with white tomentum, paniculately branched above, leafy, leaves small ovate or flabellate decompoundly pinnatisect, segments minute linear or obovate obtuse spreading, rachis simple or lobulate, heads $\frac{1}{6}$ in. diam. subglobose rather remote pedicelled secund nodding in short or long axillary strict erect racemes, invol. bracts tomentose outer linear green, inner orbicular broadly scarious, receptacle small convex obscurely pubescent. *Clarke Comp. Ind.* 165.

WESTERN TIBET, alt. 9–14,000 ft., *Thomson.*—DISTRIB. Affghanistan, S. Persia, Kurdistan.

Described by Boissier as a perennial, but the Tibetan examples are rather like biennials and very strongly scented. *Stem* 3–4 ft., grooved and ribbed, branches long

suberect. *Leaves* very finely cut, sessile or petioled. *Heads* numerous, yellow, usually rather distant; receptacle very obscurely pubescent; corolla of ☿ very short, almost cupular, glabrous or pubescent.—Placed in the section *Absinthium* by Boissier and Clarke, but it is most closely allied to *A. Falconeri*, and the pubescence of the receptacle is totally different from the long hairs of the *Absinthium* section.

22. **A. Falconeri,** *Clarke mss.*; hoary tomentose, stem woody and branched below, branches slender strict erect simple, leaves small broad short lower 2-pinnatisect floral and upper pinnatifid equally tomentose on both surfaces, segments small subacute pointing upwards, heads $\frac{1}{6}$ in. diam. hemispheric pedicelled nodding forming a simple terminal secund leafy raceme, invol. bracts tomentose, outer linear green, inner oblong obtuse tomentose green, innermost scarious, receptacle small convex.

WESTERN TIBET; *Falconer.*

A foot high, branches very slender but stiff, not grooved. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in. long, and as broad, radical and lower cauline with slender petioles; upper cauline, sessile; segments linear or narrowly lanceolate. *Heads* in perfectly simple secund strict erect racemes terminating the erect branches.—I have seen no specimens but 3 of Falconer's, and I have hence no idea how much this species may vary: its very slender, simple, erect branches and racemes are unlike any other, but it may be a contracted form of *A. Moorcroftiana.*

23. **A. Stracheyi,** *Hook f. & T.*; *Clarke Comp. Ind.* 164; dwarf, softly villously tomentose, branches annual simple strict erect very stout from a very large woody branched many-headed rootstock, leaves 3–6 in. linear-oblong 2-pinnatisect subsilkily villous on both surfaces, segments close-set short linear or lanceolate subacute, heads $\frac{1}{3}$ in. diam. broadly hemispheric shortly pedicelled nodding forming a simple terminal secund stout leafless raceme, invol. bracts numerous obovate tomentose with broad brown scarious margins, receptacle broad, corolla densely villous.

WESTERN TIBET; Manasarowar Lake, alt. 15,000 ft., *Strach. & Winterb.*; Lanak Pass and Valley above Pugha, alt. 15–17,000 ft., *Thomson*; Rupchu, *Heyde.*

A very remarkable species, with the heads of a *Tanacetum*, but racemed like the Abrotanoid *Absinthia. Root* woody, a foot long; rootstock of numerous short branches as thick as the finger, clothed with sheathing bases of old petioles. *Achenes* $\frac{1}{12}$ in. long, cuneiform, compressed, unlike those of most *Artemisia.*

SECT. IV. **Absinthium.** *Heads* heterogamous; ray-fl. ♀, disk-fl. ☿, both fertile; receptacle covered with long hairs.

* *Perennials.*

24. **A. Absinthium,** *Linn.*; *Boiss. Fl. Orient.* iii. 373; perennial, hoary-pubescent, stems erect angular and ribbed, leaves ovate or obovate unequally 2–3-pinnatifidly cut into spreading linear or lanceolate obtuse segments hoary on both surfaces, radical and lower cauline narrowed into winged petioles, heads $\frac{1}{3}$–$\frac{1}{4}$ in. diam. pedicelled hemispheric in drooping secund racemes terminating the branches, outer invol. bracts oblong hoary narrowly scarious, inner orbicular broadly scarious, receptacular hairs long straight. *DC. Prodr.* vi. 125. *Clarke Comp. Ind.* 104; *Reichb. Ic. Fl. Germ.* t. 1029. Absinthium vulgare, *Gærtn. Fruct.* ii. t. 164.

KASHMIR; alt. 5–7000 ft., *Thomson, Falconer,* &c.—DISTRIB. N. Asia, Affghanistan and westward to the Atlantic.

Very aromatic, almost silkily hoary, stem 1–3 ft. *Leaves* 1–2 in. *Heads* numerous, but hardly crowded; fl. yellow; ray-corolla dilated below; anthers acuminate (not aristate). *Achenes* elliptic-oblong or somewhat obovoid, $\frac{1}{24}$ in. long.

25. **A. minor,** *Jacquem. in DC. Prodr.* vi. 124; dwarf, silkily tomentose, densely tufted, stems very many short stout ascending from a stout woody rootstock sheathed with scarious dry petiole-bases below and clothed with imbricating leaves above, a few elongating simple and flowering, leaves small densely imbricate and sessile on the flowerless stems flabellately 2-pinnatifid sessile or petioled on the flowering stem uppermost pinnatifid, heads $\frac{1}{3}$ in. diam. bracteate hemispheric subsessile subsecund solitary or spicate, invol. bracts tomentose with broad coloured scarious margins, receptacular hairs long. A. tibetica, *Herb. Ind. Or. H. f. & T.* A. Sieversiana, *var.* tibetica, *Clarke Comp. Ind.* 165.

WESTERN TIBET, alt. 15–18,000 ft., *Jacquemont, Thomson.* EASTERN TIBET, N. of Sikkim, alt. 18,000 ft., *J. D. H.*

A strongly scented, densely tufted, dwarf species of the loftiest and driest regions, with a woody root of probably great age giving off many tufts of short leafy branches, of which few elongate and flower. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., grey; petiole when present, rather stout. *Heads* rarely more than 6, subtended by a leaf or bract that is linear or ovate, entire or lobed, or sometimes reduced to one of the involucral series; corollas with pubescent lobes; anthers acuminate.

** *Annuals or biennials.*

26. **A. Sieversiana,** *Willd.*; *Ledeb. Fl. Ross.* ii. 599; annual or biennial, hoary-pubescent, stem erect angled and ribbed simple or paniculately branched above, leaves mostly petioled broadly ovate 2-pinnatisect segments obtuse and obscurely lobed hoary on both surfaces, heads $\frac{1}{4}$ to nearly $\frac{1}{2}$ in. diam. broadly hemispheric pedicelled secund nodding distant in lax long racemes terminating the branches, outer invol. bracts green hoary, inner broadly scarious, receptacular hairs long straight. *Clarke Comp. Ind.* 165; *excl. var.* [illegible]; *DC. Prodr.* vi. 126.

WESTERN HIMALAYA; from Kashmir to Lahul, alt. 8–10,000 ft. WESTERN TIBET, alt. 12–14,000 ft., *Falconer,* &c.—DISTRIB. From China, westward to S. Russia.

Very similar in many respects to *A. Absinthium,* but annual (in the Indian specimens) with much larger heads, distant on the long lax racemes, and the anthers are aristate.—Ledebour describes the receptacle as sometimes nearly glabrous, in which case the *A. pallida* could be hardly distinguished from it.

27. **A. macrocephala,** *Jacquem.*; *DC. Prodr.* vi. 125; annual, dwarf, hoary-tomentose, branches many ascending from the root simple or sparingly divided, leaves ovate 2-pinnatisect, segments linear obtuse or subacute hoary on both surfaces, lower stoutly petioled, heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam. broadly hemispheric shortly pedicelled secund nodding distantly racemed at the end of the branches, outer invol. bracts green linear tomentose, inner oblong broadly scarious, receptacular hairs long straight. A. Griffithiana, *Boiss. Fl. Orient.* iii. 376.

KUNAWUR and WESTERN TIBET; alt. 12–16,000 ft., *Jacquemont, Thomson.* Manasarowar Lake, alt. 15,500 ft., *Strach. & Winterb.*—DISTRIB. Affghanistan, Central Asia.

Stem rather stout for the size of the plant, 4–8 in. long, often decumbent at the base; branches spreading in a circle from the root, simple, rarely suberect and again branched. *Leaves* about $\frac{1}{2}$ in. long, mostly sessile. *Heads* yellow; invol. bracts numerous; corollas often with hairy lobes; anthers acuminate.

DOUBTFUL SPECIES.

A. (Abrotanum) ROYLEANA, *DC. Prodr.* vi. 115; "herbaceous, strict, wholly glabrous, cauline leaves pinnatipartite from the base, pinnæ pairs 7 or 9, lobes broadly linear acute entire, branches of the panicle erect, heads racemed secund subglobose subcernuous, invol. bracts ovate subrotund margins scarious.—A most distinct species, leaf-lobes 10 by $1\frac{1}{2}$ lines."—N.W. India, *Royle.* I cannot identify this.

A. (Abrotanum) PALLENS, *Wall. Cat.* 3302; a very obscure plant, procured from the Madras missionaries by Wallich, and called *A. absinthii,* by Heyne; it resembles

A. Absinthium, but the root is clearly annual and the receptacle is glabrous; the specimens are very poor and also resemble *A. Sieversiana*; it is properly a garden plant.

A. LEPTOPHYLLA, *Don Prodr.* 182; *DC. Prodr.* vi. 126; "silky, leaves bipinnate linear-subulate acute rarely divided, stem ascending simple leafy, flowers unknown." —"Alpine region of Nipal, Wallich; very near *A. pontica*."—It is impossible to recognise this by the description.

A. GMELINI, var. δ, *Jacquemontiana*, and var. ξ, *Cashmyrica*, Bess. Monog. Abrot. Suppl. 40 & 41; DC. Prodr. vi. 107, may be forms of *vulgaris*, *vestita*, or *Roxburghiana*.

A. MOLLISSIMA, *Don Prodr.* 182; *DC. Prodr.* vi. 125; "wholly clothed with white wool, stem erect simple a span high angled, leaves 2 in. spreading elegantly sub-3-pinnate leaflets linear-lanceolate flat quite entire mucronate, heads axillary sessile woolly, invol. bracts linear mucronate.—Sirinagur."—This is undeterminable.

A. KOHATICA, *Klatt in Sitzung. Münch. Akad.* 1878, 91. The meagre description does not even state to what section of the genus this plant belongs.

TRIBE VII.—SENECIONIDEÆ.

73. TUSSILAGO, *L.*

A white, woolly, scapigerous herb, with a perennial stoloniferous root-stock. *Leaves* all radical, coming after the flowers, orbicular-cordate, toothed. *Heads* solitary, heterogamous, radiate, yellow; ray-fl. ♀ ∞-seriate, fertile, ligule narrow spreading; disk-fl. ☿, sterile, tubular, limb elongate 5-fid. *Involucre* campanulate or cylindric; bracts 1-seriate, equal, with a few very small outer ones; receptacle flat, naked. *Anther-bases* entire or subauricled. *Style-arms* of ☿ entire, obtuse. *Achenes* of ♀ linear, 5–10-ribbed, with slender rough pappus-hairs; of ☿ slender, empty, pappus scanty.

1. **T. Farfara,** *Linn.*; *Boiss. Fl. Orient.* iii. 377; *DC. Prodr.* vi. 208; *Clarke Comp. Ind.* 166. T. rupestris, *Wall. Cat.* 2990.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–11,000 ft., *Blinkworth*, &c.—DISTRIB. N. & W. Asia, N. Africa, Europe.

Leaves long petioled, 3–10 in. broad, cobwebby above, white-tomentose beneath. *Scapes* 1 or more, 4–10 in., tomentose, scaly. *Head* 1–1½ in. diam., bright yellow, drooping in bud. *Pappus* soft, snow-white.

74. CREMANTHODIUM, *Benth.*

Perennial scapigerous herbs. *Leaves* chiefly radical, cordate or reniform, toothed, rarely pinnatifid. *Heads* solitary on a leafless or 1–2-leaved or bracteate scape, always nodding or deflexed, heterogamous, radiate, yellow or pale pink; ray-fl. ♀, 1-seriate, fertile, ligule large spreading 2–4-toothed; disk-fl. ☿, fertile, tubular, limb cylindric 5-fid. *Involucre* campanulate or hemispheric, bracts 1-seriate, membranous; receptacle flat, naked, pitted. *Anther-bases* sub-entire. *Style-arms* short or long, flattened, obtuse or acute. *Achenes* angled, 5–10-striate, glabrous; pappus-hairs copious, white or reddish, slender, rough or barbellate.—DISTRIB. Species 8, all Himalayan.

This genus is hardly distinguishable from *Senecio*, § *Ligularia*. The species are probably unduly multiplied, but more specimens are required to determine their limits; the involucral bracts vary much in most, in number, length, breadth, and in being glabrous or pubescent; all the species are nearly glabrous with black or brown pubescence at the top of the scape and base of the involucre. The style-arms differ much in the various species. The bracts are as in *Senecio*, § *Ligularia*, 1-seriate, but overlap in two series; the heads are ecalyculate in all.

* *Nerves of leaf radiating from the petiole.*

1. **C. reniforme,** *Benth. in Hook. Ic. Pl.* t. 1141; nearly glabrous, 12–18 in. high, leaves long-petioled reniform or orbicular sinuate-toothed

glabrous palmately nerved, head 3 in. diam., invol. bracts oblong-lanceolate acuminate, ligules broad entire or minutely toothed yellow, achenes cuneate, pappus white. *Clarke Comp. Ind.* 167; Ligularia reniformis, *DC. Prodr.* vi. 315. Senecio reniformis, *Wall. Cat.* 3141.

Central and Eastern Himalaya; Nipal, *Wallich*; Sikkim, alt. 10–15,000 ft., *J. D. H.*

Slender. *Radical leaves* few; petiole 6–12 in., very slender; blade 2–4 in. diam., sometimes pubescent beneath, sinus broad and rounded or narrow and acute, cauline solitary; petiole with an inflated amplexicaul sheath. *Scape* sparsely hairy with black hairs towards the tip. *Invol. bracts* 1 in. long, sparingly hairy; ligules sometimes 1 in. long and ¼ broad, tip entire or toothed, disk brown. *Style-arms* long, flexuous, slender, acuminate. *Achenes* ⅕ in. long; pappus-hairs minutely scabrid.

2. **C. Decaisnei,** *Clarke Comp. Ind.* 168; more or less pubescent, 6–10 in. high, leaves chiefly radical reniform coriaceous crenate glabrous or with white appressed tomentum beneath, petiole stout, heads 1½–2½ in. diam., ligules broad 3-toothed yellow, achenes slender, pappus white. Ligularia, n. 7, *Herb. Ind. Or. H. f. & T.*

Alpine Himalaya; from Kashmir, alt. 11,000 ft., *Falconer, Jacquemont*; and Kumaon, alt. 15,000 ft., *Strach. & Winterb.*; to Sikkim, alt. 14–16,000 ft., *J. D. H.*

A shorter and more robust plant than *C. reniforme*, with smaller leaves, shorter stouter petioles, much broader oblong invol. bracts, and very narrow achenes. *Style-arms* linear, ½-cylindric, slightly dilated at the obtuse tip.

3. **C. Thomsoni,** *Clarke Comp. Ind.* 169; nearly glabrous, 6–8 in. high, leaves all subradical reniform broadly crenate, head 1–1½ in. diam., invol. bracts acuminate, ligules broad deeply 3-fid. yellow, achenes linear-oblong, pappus red-brown. Ligularia, n. 14, *Herb. Ind. Or. H. f. & T.*

Sikkim Himalaya; Kankola valley, alt. 13–14,000 ft., *J. D. H.*

A much smaller plant than *C. reniforme*; leaves 1–1½ in. diam., more crenate than toothed; invol. bracts ½ in., oblong-lanceolate; ligules ¾–1 in.; style-arms linear, ½-cylindric, long, subacute; achenes ⅛–⅙ in.

4. **C. Hookeri,** *Clarke Comp. Ind.* 169; nearly glabrous, 6–8 in. high, leaves chiefly cauline reniform denticulate, petiole short with long narrow sheaths, heads 1 in. diam., involucre campanulate, ligules very slender yellow, achenes narrowly oblong, pappus reddish. Ligularia, n. 16, *Herb. Ind. Or. H. f. & T.*

Sikkim Himalaya; Yeumtong, alt. 13–15,000 ft., *J. D. H.*

This differs from *C. Thomsoni* in the cauline leaves with shorter petioles and minute teeth, the smaller heads more campanulate; involucre with linear bracts, and very slender ligules. *Style-arms* linear, ½-cylindric, rather long, subacute.

5. **C. palmatum,** *Benth. in Hook. Ic. Pl.* t. 1142; slender, hairy, 4–7 in. high, leaves reniform acutely palmately 5–10-lobed to near the middle, heads 1½–2½ in. diam., ligules very broad pink 2–4-fid, achenes short, pappus white. *Clarke Comp. Ind.* 168. Ligularia palmata, *Herb. Ind. Or. H. f. & T.*

Sikkim Himalaya; Kankola valley, alt. 12–14,000 ft., *J. D. H., Elwes.*

An elegant species, with very large heads for the size of the plant, and broad pale pink rays that do not stand horizontally, but are erecto-patent, giving the head, which is sharply deflexed with a narrow base to the involucre, a triangular profile. *Style* hispid far below the arms, which are linear, ½-cylindric, with rounded tips. The achenes are too young to ascertain their form and size.

** *Nerves of leaf pinnate.*

6. **C. oblongatum,** *Clarke Comp. Ind.* 168, *excl. var.* β; glabrous, 4–8 in. high, leaves chiefly radical orbicular or orbicular-oblong, base rounded or

reniform toothed coriaceous pinnately nerved, heads 1½ in. diam., ligules broad 3-toothed or 5-fid, yellow, achenes slender, pappus white. Ligularia arnicoides, *Wall. Cat.* 3138, *in part*; *DC. Prodr.* vi. 314, *in part.*

NIPAL, *Wallich.* SIKKIM HIMALAYA, near the Tibetan frontier, alt. 12–16,000 ft., *J. D. H.*

Usually a robust species. *Leaves* 2–2½ in. diam., pale beneath, with coarsely reticulated nerves; petiole stout, 1–2 in. long, not inflated at the base. *Scape* with often many oblong bracteal leaves. *Invol. bracts* glabrous or pubescent, oblong or linear-oblong; ligules ½–¾ in. long. *Style-arms* very short, with dilated acute tips. *Achenes* ⅛ in. long.—The alternate nerves of the leaf distinguish this from all others but *C. pinnatifidum.*

7. **C. pinnatifidum,** *Benth. in Hook. Ic. Pl.* t. 1142; 4–6 in. high, leaves chiefly radical oblong pinnatifid, lobes oblong acute 1-toothed on the lower margin or entire, petiole short, scape naked or with 1 sheath, head 1½–2 in. diam., ligules broad 2–4-toothed yellow, achenes small, pappus white. *Clarke Comp. Ind.* 167. Ligularia pinnatifida, *Herb. Ind. Or. Hook. f. & T.*

SIKKIM HIMALAYA; Kankola valley, Lachoong, and Yeumtong, alt. 13–15,000 ft., *J. D. H., Elwes.*

A very elegant species, remarkable for the pinnatifid leaves, almost naked scape, and large deflexed head with the ligules suberect as in *C. palmatum.* The invol. bracts vary greatly in number, length, and breadth. *Style-arms* rather short, semi-cylindric, subacute.

75. DORONICUM, *Linn.*

Perennial herbs. *Leaves* alternate, radical long-petioled; cauline distant, often amplexicaul. *Heads* large, long-peduncled, heterogamous, radiate, yellow; ray-fl. ♀, 1-seriate, fertile, ligule elongate entire or 2–3-toothed; disk-fl. ☿, fertile, tubular, limb 5-fid. *Involucre* broadly campanulate or hemispheric; bracts 2-seriate, subequal, herbaceous, acuminate; receptacle hemispheric, naked. *Anther-bases* entire or subauricled. *Style-arms* of ☿ linear, tip rounded or truncate and penicillate. *Achenes* of ☿ oblong-turbinate, 10–∞-ribbed; pappus hairs copious, short or long, rigid; of ♀ (rarely of all) often 0.—DISTRIB. Species about 10, temperate Europe and Asia.

1. **D. Roylei,** *DC. Prodr.* vi. 321; corymbosely branched above, sparsely hairy or villous, leaves broadly ovate sinuate-toothed, radical long-petioled, upper cauline amplexicaul, heads many glandular-pubescent base turbinate, achenes of the ray epappose, of the disk pappose. *Clarke Comp. Ind.* 169. Fullaronia kumaonensis, *DC. l. c.* v. 281.

WESTERN HIMALAYA; from Kashmir, *Royle, Falconer,* to Garwhal, alt. 10,000 ft., *Strach. & Winterb.*

Herbaceous, erect, 2–4 ft. high. *Leaves* 4–5 in. long, base acute rounded or cordate; petiole 4–6 in. *Heads* few or numerous, 1–2 in. diam., on slender peduncles that swell at the tip, forming a turbinate base to the head; invol. bracts ½–⅔ in. long, finely acuminate; ligules nearly as long. *Achenes* deeply grooved, all glabrous, or the outer sparsely hairy; pappus short, reddish.—Very closely allied to *D. Pardalianches,* L., of Europe.

VAR. *epapposa*; heads smaller, pappus 0.—Kashmir, *Falconer.* Possibly a distinct species, but the specimens are very imperfect, the achenes are rather more cylindric, and the ribs more regular.

2. **D. Hookeri,** *Clarke mss.*; stem subsimple sparsely softly villous, leaves all narrowed into short ½-amplexicaul petioles oblong or elliptic-lanceolate obtuse or acute entire or irregularly toothed, heads 1–2 glandular-pubescent base truncate, achenes all pappose. D. scorpioides, *Clarke Comp. Ind.* 169, *in part.*

SIKKIM HIMALAYA; Lachen and Tungu, alt. 12–14,000 ft., *J. D. H.*

A robust herb, 1–2 ft. high; radical leaves 0 or soon withering; cauline 4–6 by 1–2 in., often unequal-sided. *Heads* 2½ in. diam.; invol. bracts ovate-lanceolate, acuminate; ligules about as long. *Achenes* (ripe not seen); pappus short, reddish.

3. **D. Falconeri,** *Clarke mss.*; stem simple puberulous or glabrate, leaves all petioled obovate or spathulate obscurely toothed, heads 1–2 glandular-villous base turbinate, achenes of the ray epappose, of the disk pappose. D. scorpioides, *Clarke Comp. Ind.* 169, *in part.*

KASHMIR, alt. 13,000 ft., *Falconer, Clarke.* WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke.*

A stout herb, 1–1½ ft. high, stem nearly naked above. *Leaves*, including the petiole, 5–6 in. long, variable in breadth. *Heads* 2–3 in. diam.; invol. bracts linear-lanceolate; ligules very numerous, longer than the bracts. *Achenes* very immature; pappus short.

76. GYNURA, *Cass.*

Succulent herbs, rarely undershrubs, glabrous or hispid. *Leaves* alternate, entire toothed or pinnatisect. *Heads* solitary or corymbose, bracteolate at the base, homogamous, disciform, yellow or purplish; fl. all ☿, fertile, tubular, with rarely a few more slender outer ♀ ones, limb 5-toothed. *Involucre* cylindric or subcampanulate; bracts 10–12, 1-seriate, narrow, equal, margins scarious; receptacle flat, pitted or shortly fimbrillate. *Anther-bases* entire or subauricled. *Style-arms* slender; tips long, subulate, hispid. *Achenes* narrow, many-ribbed; pappus hairs copious, ∞-seriate, slender, white.—DISTRIB. Species about 20, warm regions of Asia, Africa, and Australia.

The species of this genus are much confused in De Candolle's Prodromus, and there are probably fewer in India than are here described.

* *Stem erect.*

1. **G. nitida,** *DC. in Wight Contrib.* 24; *Prodr.* vi. 299; glabrous except the puberulous pedicels, stem robust branched below, branches simple, leaves crowded towards the bases of the branches obovate or oblanceolate acute or obtuse succulent remotely serrate, base narrowed auricled or not, uppermost sessile, heads with fleshy turbinate pubescent bases, invol. bracts glabrous, achenes hispid. *Wight Ic.* t. 1121; *Clarke Comp. Ind.* 171. G. simplex, *Dalz. & Gibs. Bomb. Fl.* 130. Cacalia incana, *Heyne in Wall. Cat.* 3158.

NILGHERRY and PULNEY MTS., *Wight*, &c.

There are two forms of this in Wight's Herbarium, one a very robust plant from the Nilgherry mountains, with a long stout stem and broadly oblong auricled upper cauline leaves (as figured in Wight's Icones); the other has short branches, with narrow, more petioled leaves; both have hispid achenes. The former of these closely resembles in habit *G. angulosa*, and the latter *G. pseudo-china.*

2. **G. nepalensis,** *DC. Prodr.* vi. 300; tall, shrubby below and corymbosely branched above, hoarily pubescent or subtomentose, leafy, leaves obovate oblong or lanceolate the lower narrowed into a petiole entire sinuate-toothed or base subpinnatifid, heads many, invol. bracts hoary-villous, achenes glabrous or sparsely pubescent. *Clarke Comp. Ind.* 171. G. fœtens, *DC. l. c.* Cacalia aurantiaca *and* fœtens, *Wall. Cat.* 3146, 3156. C. flava, *Herb. Ham.*

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 2–5000 ft. MARTABAN; mountains near Moulmein, alt. 4–5000 ft., *Parish.* AVA, *Wallich.*—DISTRIB. Java?

A tall handsome species; stem below as thick as the little finger. *Leaves* 3–7 in., acuminate, usually irregularly coarsely toothed, hoary-pubescent on both surfaces. *Corymbs* often large and broad; heads ⅔–1 in. long.—The Javanese *G. aurantiaca* hardly differs from this, but its hairs are not white.

3. **G. lycopersicifolia,** *DC. Prodr.* vi. 300; glabrous or hoary-pubescent, stem simple erect, leaves irregularly deeply laciniately pinnatifid or lyrate, base auricled, lobes or segments very various obtuse or acute entire or toothed, invol. bracts glabrous, achenes deeply furrowed hispid. *Clarke Comp. Ind.* 172. Cacalia laciniata, *Wall. Cat.* 3153. C. pinnatifida, *Pers.*; *Herb. Wight.*

SOUTHERN MAISOR; Dindygul hills and Courtallam, *Heyne, Wight.* CEYLON, abundant up to 5000 ft., *Walker, Thwaites,* &c.

Stem 6 in. to 2 ft., erect. *Leaves* 3–5 in.; terminal lobe ovate-oblong or subcordate, or narrow and lobed; lateral spreading, sometimes reduced to auricles on the rachis or petiole, at others 1–2 in. long and spreading, sometimes hoary with white hispid pubescence; basal auricles large, small or 0. *Heads* $\frac{1}{3}$–$\frac{2}{3}$ in. long, usually rather numerous and panicled.—I have seen no specimen of Clarke's var. β *Andersoni* from Upper Birma, which is beyond British India.

4. **G. angulosa,** *DC. Prodr.* vi. 298; robust, quite glabrous, corymbosely branched, leaves large sessile obovate oblanceolate or oblong acuminate irregularly toothed, base contracted simple or auricled, upper oblong sessile with broad auricled bases, heads many large, peduncles invol. bracts and achenes quite glabrous or papillose between the ribs. *Clarke Comp. Ind.* 170. G. simplex, *Dalz. & Gibs. Bomb. Fl.* 130. Cacalia angulosa, *Wall. Cat.* 3152. C. Cusimbua, *Don Prodr.* 179. Kleinia Cusimbua, *Less. in Linnæa,* 1831, 133. Porophyllum Cusimbua, *DC. l. c.* v. 650.

TEMPERATE HIMALAYA; from Garwhal to Mishmi, alt. 4–7000 ft. KHASIA MTS., alt. 4–6000 ft. Hills of the CONCAN and DECCAN; Jooner and Belgaum jungles, *Stocks, Ritchie.* MARTABAN; hills near Moulmein, *Parish.*

Stem 3–10 ft. and upwards, as thick as the little finger below. *Leaves* 6–12 in., the basal sometimes 2 ft. long. *Heads* $\frac{2}{3}$–1 in. long.—Don describes the leaves as pubescent beneath, Lessing as glabrous, which they are in all specimens I have seen except in a young and a doubtful specimen from Mishmi (Griffith), in which they are puberulous on both surfaces; but as Griffith notes his plant to be subscandent, it may be a different species. The Sikkim people have a native name for this plant much resembling that which Don gives it of *Cusimbua*, and I have no hesitation in referring his plant to *angulosa*. In the Bombay Flora *G. simplex* is described as having a tall erect unbranched stem, but the specimens from the Concan are branched corymbosely above, as in the Nipal state.

VAR. *petiolata*; leaves elliptic-lanceolate less toothed distinctly petioled.—Sikkim and Khasia Mts.

5. **G. Pseudo-china,** *DC. Prodr.* vi. 299; glabrous or pubescent, stem very short, leaves all subradical obovate narrowed into the petiole sinuate- or subpinnatifidly lobed, scapes long nearly leafless, heads few, invol. bracts and achenes glabrous or sparsely villous. G. sinuata, *DC. l. c.* 301; *Clarke Comp. Ind.* 173; *Kurz in Journ. As. Soc.* 1877, ii. 194. G. nudicaulis, *Arn. Pugill.* 33; *DC. l. c.* 301. Cacalia bicolor β, *Wall. Cat.* 3148. C. sagittaria, *Heyne in Wall. Cat.* 3159. C. bulbosa, *Lour. Fl. Coch.* 485.—*Dill. Hort. Elth.* 345, t. 258.

MADRAS PRESIDENCY (Dillenius); Courtallam, *Wight.* SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H., Clarke.* PEGU and MARTABAN, *Kurz.* CEYLON; at Galagama, alt. 3000 ft., *Thwaites.*—DISTRIB. Java, China?

Root tuberous; stem very short. *Leaves* 2–7 in. long, very variable in form. *Heads* $\frac{1}{3}$–$\frac{3}{4}$ in. long.—This I think must be the "Pseudo-china" of Dillenius, of which that author gives an excellent figure from a plant cultivated in his garden at Eltham, and which he states was a native of the Madras Presidency. It may well be doubted if this is anything more than a state of a common Eastern plant represented by *G. angulosa* in the Himalaya, and *nitida* in the Deccan. Kurz remarks of it that when young it looks scapigerous and has smaller and simpler leaves, but that as the tuberous roots enlarge it grows more robust and large, and branches from the base, with leaves

7 in. long. *G. nudicaulis* is a very small state of the plant. For remarks on the *Pseudo-china* of authors, see end of the genus under *G. hieracioides.*

VAR. *hispida,* Thwaites Enum. 166; hispidly pubescent, stem simple or sparingly branched leafy below, leaves obovate-lanceolate sinuate-toothed lower narrowed into a petiole, invol. bracts sparsely villous or glabrate, achenes glabrous. G. hispida, *Thwaites Enum.* 166; *Clarke Comp. Ind.* 172.—Ceylon; central province, on damp rocks, alt. 5–7000 ft., *Thwaites.* Stem 1–3 ft. Leaves 2–6 by $\frac{3}{4}$–$1\frac{1}{2}$ in.; heads 3–6, long-peduncled; bracteoles many; flowers orange-yellow.—The only specimen I have seen is very poor, and adds nothing to the character given by Thwaites, who observes that it is very closely allied to *G. aurantiaca,* and that it is perhaps a form of *G. sinuata* (that is, of *Pseudo-china*).

6. **G. bicolor,** *DC. Prodr.* vi. 299; glabrous, erect, stem branched, leaves obovate or oblanceolate narrowed into a winged petiole toothed or runcinately pinnatifid, lobes or teeth acute, cauline sessile deeply auricled, heads many, base very narrow, peduncles with scattered filiform bracteoles, invol. bracts quite glabrous, achenes (immature) glabrous. Cacalia bicolor, *Roxb. Fl. Ind.* iii. 412; *Salisb. Hort. Parad.* t. 25; *Bot. Reg.* t. 110.

MALACCA, *Griffith.*—DISTRIB. Moluccas.

Apparently shrubby at the base, 1–2 ft. high, rather slender, with a few scattered hairs at the base of the leaves and stem. *Leaves* 2–4 in. long, bases not auricled, teeth or lobes always recurved, entire or sparingly toothed. *Heads* $\frac{3}{4}$ in. long; base of involucre very narrow.—I have seen no authentic specimen of *G. bicolor.*

** *Stem climbing.*

7. **G. sarmentosa,** *DC. Prodr.* vi. 298; glabrous except the puberulous peduncles, climbing, leaves petioled or the uppermost sessile ovate elliptic or lanceolate acute or acuminate subentire or sinuate-toothed, heads narrow, invol. bracts glabrous, achenes glabrous. G. Finlaysoniana, *DC. l. c.* 299; *Deless. Ic. Sel.* iv. t. 55. Cacalia cylindriflora, reclinata *and* Finlaysoniana, *Wall. Cat.* 3150, 3151, 3162. Sonchus volubilis, *Rumph. Herb. Amb.* v. t. 103, f. 2.

MALACCA and PENANG, *Wallich,* &c.—DISTRIB. Siam, Java, Philippine Islands.

Stem and *branches* loosely twining, petioles and pedicels slender. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in.; nerves obscure. *Heads* panicled; bracteoles few, small; invol. bracts $\frac{1}{2}$ in. and under. *Achenes* $\frac{1}{6}$ in., ribs very close and slender.

DOUBTFUL AND EXCLUDED SPECIES.

G. AURICULATA, *Cass. Opusc. Phyt.* iii. 100; *DC. Prodr.* vi. 300. (Cacalia hieracioides) *Roxb. Hort. Beng.* 61; *Wall. Cat.* 3154. Gynura Pseudo-china, *Benth. Fl. Hongk.* 299, *not of DC., nor of Benth. Fl. Austral.* G. auriculata *and* glabrata, *Clarke Comp. Ind.* 172).—This is a Chinese plant, cultivated in Calcutta and the Mauritius Bot. Gardens, distinguishable (at once in the glabrous forms and after maceration in the pubescent ones) from all Indian species by the fine elongated reticulation of the nerves of the leaf. Whether it is Willdenow's *Cacalia hieracioides* is doubtful. Of Clarke's *G. auriculata, β puberula,* and *γ villosa* I know nothing.

G. PURPURASCENS, *DC. Prodr.* vi. 299; *Deless. Ic. Sel.* iv. t. 56 (Cacalia purpurascens, *Wall. Cat.* 3157); this is founded on a plant cultivated in the Calcutta Gardens, and said to have been introduced from Nipal; it is not, however, in Wallich's Herbarium, and is, judging from the description, probably *G. bicolor.*

77. **EMILIA.** *Cass.*

Annual or perennial herbs, often glaucous, glabrous or hairy. *Leaves,* radical crowded, petioled, entire toothed or lyrate-pinnatifid; cauline few, stem-clasping. *Heads* long-peduncled, solitary or loosely corymbose, without bracteoles at the base, homogamous, discoid, yellow or red; fl. all ☿, fertile, tubular, limb elongate 5-toothed. *Involucre* cylindric; bracts 1-seriate, equal, free or cohering

striate; receptacle flat, naked. *Style-arms* subterete, tip short obtuse or long and acute. *Achenes* subterete or angled and 5-ribbed; pappus hairs copious, white, soft, slender.—DISTRIB. Species 4 or 5, Indian and tropical African.

1. **E. sonchifolia,** *DC. in Wight Contrib.* 24; *Prodr.* vi. 302; glabrous, scabrid or puberulous, erect or diffuse, invol. bracts about equalling the purple flowers, achenes 5-ribbed scabrid, style-arms ½-cylindric tip conic.

Common throughout INDIA from the Punjab to Tenasserim and CEYLON, ascending to 4000 ft. in the hills (no specimen seen from the Malay Peninsula).—DISTRIB. Asia, Africa (America, introduced?).

A very variable weed, 4–10 in. high.

VAR. 1. *sonchifolia proper*; lower leaves lyrate-pinnatifid or sinuate-toothed puberulous or glabrous, flowering branches leafy. E. sonchifolia, *DC. in Wight Contrib.* 24; *Prodr.* vi. 302. E. sonchifolia, *vars. α* and *β*. *Clarke Comp. Ind.* 174. Cacalia sonchifolia, *Linn.*; *Roxb. Fl. Ind.* iii. 413; *Don Prodr.* 180; *Wall. Cat.* 3144. C. glabra, *Heyne in Wall. Cat.* 3145. Gynura ecalyculata, *DC. l.c.* 298. Prenanthes sarmentosa, *Wall. Cat.* 3262, E.; *Rheede Hort. Mal.* x. t. 68.—Common in most parts of India, ascending to 4000 ft. in the hills.

VAR 2. *scabra*; leaves all radical scaberulous, flowering stems naked. E. scabra, *DC. Prodr.* vi. 303; *Wight Ic.* t. 1123.—The Deccan and Khasia Mts.

VAR. 3. *mucronata*, Clarke Comp. Ind. 175; lower leaves elliptic acute at both ends upper sessile, base auricled. E. mucronata, *Wall. Cat.* 316.

2. **E. flammea,** *Cass. in Dict. Sc. Nat.* xiv. 406, t. 5; *Opusc. Phyt.* 1, t. 5; erect, glabrous or scabrid, lower leaves petioled obovate or subspathulate entire or toothed, upper large oblong or ovate-oblong deeply sagittately auricled, invol. bracts much shorter than the scarlet flowers, achenes 5-ribbed scabrid, style-arms ½-cylindric tip conic. E. sagittata, *DC. Prodr.* vi. 302; *Dalz. & Gibs. Bomb. Fl. Suppl.* 46. E. sonchifolia, var. sagittata, *Clarke Comp. Ind.* 175 (*excl. habitat*). Cacalia sagittata, *Vahl Symb.* iii. 91. Cacalia mucronata, *Heyne in Wall. Cat.* 3161. C. coccinea, *Bot. Mag.* t. 564.

The CONCAN, *Stocks* (indigenous?).—DISTRIB. Philippine Islands (*DC.*).

This approaches the larger form of *E. sonchifolia*, but the lower leaves seem to be always entire, and the scarlet heads are broader. The Concan specimens are very glaucous. I suspect that this very commonly cultivated plant is not a native of India.

3. **E. prenanthoidea,** *DC. Prodr.* vi. 303; erect, glabrous, rarely scabrid, slender, lowest leaves small ovate petioled or 0, all or upper sessile linear-oblong obtuse or acute nearly entire deeply sagittately or broadly auricled at the base, invol. bracts shorter than the scarlet flowers, style-arms dilated at the tip, achenes glabrous. *Clarke Comp. Ind.* 176. E. angustifolia, *DC. l.c.* Cacalia angustifolia *and* teres, *Wall. Cat.* 3163, 3164.

SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.* KHASIA MTS., alt. 2–4000 ft.; common. —DISTRIB. Upper Birma.

A very slender species, 1–3 ft. high, with much the habit of *E. flammea*, but with few or 0 radical leaves, and with glabrous achenes. I have seen but two specimens of the scabrid form; they were found by Dr. Thomson and myself near the Ogot river in Khasia.

4. **E. zeylanica,** *Clarke Comp. Ind.* 175; erect, glabrous or leaves pubescent, slender, lowest leaves small petioled or 0, cauline sessile narrowly linear-oblong obtuse or acute entire base deeply sagittately or broadly auricled, invol. bracts shorter than the flowers, style-arms slender tips conic, achenes scabrid. E. prenanthoidea, *Thwaites Enum.* 167, *in part.*

CEYLON; Central Province, alt. 6–8000 ft., *Thwaites.*

This very closely resembles *E. prenanthoidea* in all but the achenes and style-arms.

Thwaites describes the flowers as purple, but as he does not distinguish the following, I have not taken that character into account.

5. **E. Walkeri,** *Hook. f.*; erect, robust, quite glabrous, cauline leaves many large upper half deltoid or ovate suddenly contracted into a broad linear oblong lower half entire or sinuate-toothed, base deeply broadly auricled, heads broad, invol. bracts shorter than the flowers, style-arms dilated towards the short conic tips, achenes scabrid. E. prenanthoidea, *Thwaites Enum.* 167, *in part.*

CEYLON; Central Province. Ramboddie and Newera Ellia, *Walker, Thwaites*, &c.

This is a much larger plant than any of the preceding, with a stout polished often flexuous leafy stem, and branches 2–3 ft. high, leathery leaves, and the heads and invol. bracts broader; the achenes too are much larger than in *E. zeylanica.*

78. NOTONIA, *DC.*

Fleshy glabrous undershrubs. *Leaves* alternate, obovate or lanceolate, quite entire or crenulate. *Heads* large, long-peduncled, corymbose, bracteolate or not, homogamous, discoid, yellow; flowers ☿, all fertile, slender, limb elongate 5-fid. *Involucre* cylindric; bracts 1-seriate, equal; receptacle flat, naked. *Anther-bases* entire. *Style-arms* elongate; tips short, ovate, thick, papillose or hispid. *Achenes* long, subterete, 10-striate; pappus hairs copious, slender.—DISTRIB. Species 4 or 5, all Indian.

1. **N. grandiflora,** *DC. in Wight Contrib.* 24; *Prodr.* vi. 442; branches short very stout, leaves obovate or elliptic-lanceolate or suborbicular quite entire very fleshy, heads $\frac{3}{4}$–1 in. long, achenes glabrous, pappus hairs very slender terete. *Deless. Ic. Sel.* iv. t. 61; *Dalz. & Gibs. Bomb. Fl.* 132; *Clarke Comp. Ind.* 176. N. corymbosa, *DC. l. c.*; *Wight Ic.* t. 484. N. crassissima, *Schultz-Bip. in Pl. Hohenack.* n. 1027, *not of DC.* Cacalia grandiflora, *Wall. Cat.* 3147; C. Kleinia, *Herb. Madras.*

Hilly districts of the WESTERN PENINSULA; from the Concan southwards. CEYLON; in the Batticaloa district.

A small shrub, 2–3 ft. high, very fleshy. *Leaves* 3–5 by 1–3 in., subsessile or petioled. *Flowering peduncles* 6–12 in. long, stout, strict, naked; corymb of few or many heads, which are $\frac{3}{4}$–1 in. long. *Achenes* $\frac{1}{4}$ in. long.—I cannot distinguish *N. corymbosa* from *grandiflora* by any characters.

2. **N. balsamica,** *Dalz. & Gibs. Bomb. Fl.* 133; branches short very stout, leaves oblong ovate-oblong or oblanceolate quite entire, heads $\frac{3}{4}$–1 in. long, achenes glabrous, pappus hairs stiff flattened. Cacalia Kleinia, *Grah. Cat. Bomb. Pl.* 98, *not of Sprengel.*

The CONCAN and DECCAN; in the inland ghats rare, *Graham, Dalzell*, &c.

Very similar to *N. grandiflora*, but at once distinguishable by the pappus. Dalzell, in the Bombay Flora, refers Graham's *Cacalia Kleinia* to *N. grandiflora*, but in Wight's Herbarium there is a specimen of *balsamica* from Graham with the name attached to it by himself.

3. **N. Walkeri,** *Clarke Comp. Ind.* 176; branches long, leaves long-petioled elliptic-lanceolate acuminate quite entire or crenulate or gland-serrulate, heads $\frac{1}{2}$ in. long in very large compound corymbs, achenes sparsely hairy, pappus hairs very slender terete. Gynura Walkeri, *Wight Ic.* t. 1122. Senecio Walkeri, *Thwaites Enum.* 167. S. nilagerensis, *Schultz-Bip. Pl. Hohenack.* n. 1353.

NILGHERRY MTS.; in woods, alt. 7–8000 ft., *Wight.* CEYLON; Central Province, alt. 7–8000 ft., *Walker*, &c.

Shrubby, 6–7 ft.; stems naked below, often 1 in. diam. *Leaves* 4–7 by 1–1$\frac{1}{2}$ in., not so fleshy as in the preceding species; petiole 1–2 in. *Pedicels* with usually many

small bracts.—This has more the habit of a *Senecio* than of a *Notonia*, but the styles are characteristic of the latter genus. Thwaites describes the flowers as pale yellow in Ceylon, and Wight as white in the Nilgherries.

DOUBTFUL SPECIES.

N. CRASSISSIMA, *DC. Prodr.* vi. 442; *Kurz in Journ. As. Soc.* 1877, ii. 194 (Cacalia crassissima, *Wall. Cat.* 3155); Wallich's specimen of this (from the Segaen hills, Ava) has no flowers, and the branches and leaves do not differ from those of *N. grandiflora.* Kurz, who keeps it up, gives Wallich's habitat, and quotes Griffith's *Ic. Pl. Asiat.* t. 470, as the same plant; but that figure is utterly unlike any known plant. So many Deccan plants are Avan, that this is probably *N. grandiflora.*

79. **SENECIO,** *Linn.*

Herbs, undershrubs or shrubs. *Leaves* radical or alternate, entire or variously divided. *Heads* solitary corymbose or racemose, heterogamous (rarely homogamous) usually yellow; ray-fl. ♀, fertile, ligulate (or 0): disk-fl. ☿, fertile, tubular, 5-fid. *Involucre* various, bracts 1 or sub-2-seriate, equal, erect, free or connate at the base, with few or many very short outer ones (heads bracteolate); receptacle flat or convex, naked, pitted or fimbrillate. *Anther-bases* obtuse, or auricled, or minutely tailed. *Style-arms* of ☿ recurved, tips truncate and penicillate, rarely rounded or with a short narrow point. *Achenes* subterete or outer dorsally compressed, 5–10-ribbed; pappus-hairs copious or sparse, soft, white, smooth, scabrid or barbellate.—DISTRIB. About 900 species, chiefly in temperate climates and mountains of the tropics.

I have refrained from regarding various Indian species of the section *Jacobæa* as forms or varieties of North Asiatic and European, the limits of these being so badly defined that a study of the whole genus would be necessary to do so with confidence; of the other sections the species are certainly almost all South Asiatic. Amongst the Indian anomalous species are those of the group of *Madaractis*, hitherto referred to *Doronicum*, whose pappus is usually red and rigid; amongst these the most remarkable are *S. Grahami* with paleaceous pappus, and *S. belgaumensis* with none at all. The many-seriate, imbricating, involucral bracts of *S. lavandulæfolius* in its ordinary state are altogether unlike those of the genus, and the species is referable to *Senecio* only on the (tenable) hypothesis of the bracteoles being very numerous and appressed to the involucral bracts.

SERIES A. Anther-cells obtuse at the base, not produced downwards into tails.

SECT. I. **Jacobæa.** Erect herbs. *Heads* usually campanulate; invol. bracts 1-seriate, subequal; ligules usually conspicuous, rarely minute, 0 in 15. *dubius. Achenes* all pappose (except forms of 2. *chrysanthemoides* and 5. *diversifolius*); pappus longer than the achenes, of soft white (rarely red) equal hairs.

* *Annuals or biennials. Disk.-fl. with a funnel-shaped or campanulate limb. Leaves broad or narrow, entire toothed or lyrate-pinnatifid.*

1. **S. graciliflorus,** *DC. Prodr.* vi. 365; glabrous, erect, stem flexuous terete or nearly so, leaves large petioled pinnatifid, lobes 6–8 pair ovate- or oblong-lanceolate acuminate coarsely unequally serrate, petiole not auricled, heads $\frac{1}{3}$ in. many narrow bracteolate 5–8-fld. in much branched corymbs or panicles, invol. bracts 5–7 linear obtuse glabrous, ligules 3–5, achenes ribbed glabrous all pappose. *Clarke Comp. Ind.* 189. S. Royleanus, *DC. l. c.* 367. S. tanacetoides, *Kunth & Bouché Ind. Sem. Hort. Berol.* 1845, 12. Cacalia graciliflora, *Wall. Cat.* 3149.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 8–13,000 ft.

Stem 2–6 ft., sometimes angled and grooved. *Leaves* 4–6 by 2–4 in., membranous,

petiole not auricled. *Corymb* with filiform bracts; heads erect or drooping. *Involucre* cylindric. *Achenes* ribbed, $\frac{1}{10}$ in.; pappus white.—The var. *Hookeri*, Clarke l. c., differs only in the rather broader heads with more developed ligules; var. *pubescens*, from Chumba, has hairs on the leaf-nerves beneath.

2. **S. chrysanthemoides,** *DC. Prodr.* vi. 365; glabrous below, pubescent above, stem erect usually much corymbosely branched, leaves glabrous rarely hoary beneath, lower lyrate-pinnatifid with an auricled petiole and large gashed terminal lobe, upper sessile broadly amplexicaul pinnatifid, the lobes often very large, auricle gashed and toothed, heads $\frac{1}{2}$ in. diam. numerous bracteolate corymbose many-fld., invol. bracts 10–12 oblong acute, ligules 8–12, achenes glabrous or puberulous all with white pappus or the ray without pappus.

TEMPERATE HIMALAYA; from KASHMIR to Sikkim, alt. 8–13,000 ft. KHASIA MTS., alt. 4–5000 ft.

The commonest *Senecio* of the Himalaya, simulating the European *S. chrysanthemifolius*, but with glabrous achenes. *Stem* 2–6 ft., robust, striate. *Leaves*, lower sometimes reduced to an ovate or oblong crenate blade, at others lyrate with a large terminal and few or many small lateral lobes, always less acutely cut than the upper, and narrowed into a long or short winged petiole; upper leaves 1–9 by $\frac{1}{2}$–4 in., with always broadly auricled toothed bases; rarely all the leaves are lyrate-pinnatifid; terminal lobes ovate, oblong or deltoid. *Corymb* in ordinary states much branched with auricled forks and stout peduncles with filiform bracts; invol. bracts $\frac{1}{6}$–$\frac{1}{4}$ in., thickened at the bases. *Achenes* $\frac{1}{10}$ in., strongly ribbed.

VAR. 1. *chrysanthemoides proper*; lower leaves glabrous lyrate-pinnatifid, upper sessile amplexicaul, heads many glabrescent, achenes glabrous all pappose. S. chrysanthemoides, *DC. l. c.* S. laciniatus *and* stipulatus, *Wall. Cat.* 3124, 3126. S. lætus, *Edgew. in Trans. Linn. Soc.* xx. 74. S. Jacobæa, *Don Prodr.* 179.—Common.

VAR. 2. *sisymbriiformis*; puberulous, all the leaves lyrate with a large terminal ovate toothed lobe, heads pubescent, achenes all pappose. S. sisymbriiformis, *DC. Prodr.* vi. 366; *Clarke Comp. Ind.* 190.—N.W. India, *Royle*; Kashmir, *Falconer*; Marri, *Fleming*.

VAR. 3. *spectabilis*; foliage, &c., of var. 1, but ray flowers without pappus. S. spectabilis, *Wall. Cat.* 3127, *a. c.*; *DC. l. c.*

VAR. 4. *khasiana*; foliage and heads of var. 1, but achenes puberulous, pappus of ray-fl. scanty or 0, of the disk white or reddish. S. spectabilis, *Wall. Cat.* 3127 B; *Clarke Comp. Ind.* 190, *in part*. S. pallens, *var.* khasianus, *Clarke l. c.* 192.—Khasia Mts., alt. 4–5000 ft. This unites *S. diversifolius* with *chrysanthemoides*.

VAR. 5. *analogus*; leaves smaller cobwebby beneath all lyrate-pinnatifid, heads usually smaller glabrescent or hoary, achenes all pappose.—S. analogus, *DC. l. c.* N.W. India, *Royle*; Kashmir, *Falconer, Thomson*; Marri, *Fleming*.

3. **S. bracteolatus,** *Hook. f.*; dwarf, simple, 4–6 in. high, stem above and leaves beneath tomentose, radical-leaves long petioled elliptic obtuse toothed or lobulate, cauline sessile with shorter petioles pinnatifidly lobed, heads 1–3 $\frac{3}{4}$ in. diam. many-fld., bracteoles many subulate-lanceolate half as long as and appressed to the similar purplish invol. bracts, ligules 10–12 longer than the involucre 4-nerved, achenes glabrous, pappus white. S. alpinus, *Clarke Comp. Ind.* 190, *not of Scopoli.*

SIKKIM HIMALAYA; alt. 15–16,000 ft., *J. D. H.*

I at first supposed this to be an alpine dwarf form of *S. chrysanthemoides*, but the many long bracteoles of the involucre are very different from what any form of that plant presents. I found it but once, at an early season for the lofty elevation it inhabits, and the ticket was lost with many of my specimens from that region. It is a high Alpine form, and hence specimens from other localities would show much variation from those described. It differs from *S. alpinus* notably in the bracteolate heads.

4. **S. tibeticus,** *Hook. f.*; dwarf, simple, 4–7 in. high, stem petioles and young leaves beneath white cottony, leaves hoary, radical long-petioled oblanceolate lyrate-pinnatifid, terminal lobe ovate-lanceolate erose, lower lobes short variously cut, cauline leaves elongate narrow irregularly subpinnatifid base auricled, heads few ¾ in. diam. campanulate many-fld. bracteolate on long stout peduncles with scattered subulate bracts, invol. bracts linear-lanceolate acuminate cottony, ligules 16–20 revolute 4-nerved longer than the involucre, achenes (young) glabrous, pappus white.

WESTERN TIBET; Karakoram, near Ashkoley, alt. 10,700 ft., *Clarke.*

This differs from any form of *S. chrysanthemoides* in the few and much larger more campanulate heads, as well as in the habit and few long peduncles.

5. **S. diversifolius,** *Wall. Cat.* 3127: very robust, glabrous, leaves pinnatifid or lyrate-pinnatifid with broad auricled bases and oblong gashed lobes, heads many ½–¾ in. diam. broadly campanulate or hemispheric bracteolate many-fld., invol. bracts 10–16 oblong acute, ligules 10–16, achenes glabrous, pappus of the ray-fl. 0, of the disk red. *DC. Prodr.* vi. 366; *Clarke Comp. Ind.* 191. S. raphanifolius, *Wall. Cat.* 3125; *DC. l. c.*

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 10–14000 ft., *J. D. H.*

Usually much stouter than *S. chrysanthemoides*, with broader heads and more flexuous, and at once distinguished by the red pappus at all ages, from all forms of that plant but var. 4.

6. **S. nudicaulis,** *Ham. in Don Prodr.* 179; glabrous or sparsely pubescent, radical leaves often rosulate sessile or narrowed into a petiole obovate or linear- or obovate-oblong or spathulate obtuse obtusely crenate, cauline sessile linear-oblong or obovate irregularly crenate lobulate or toothed base contracted or dilated and auricled, heads many ⅓ in. diam. bracteolate broadly campanulate many-fld., invol. bracts 10–14 oblong acute 3-nerved, achenes puberulous all with whitish pappus. S. pallens, *Wall. Cat.* 3132; *DC. Prodr.* vi. 367; *Clarke Comp. Ind.* 191, *excl. var. γ.* S. violaceus *and* truncatus, *Wall. Cat.* 3134, 3137; *DC. l. c.* S. denudatus, *Don Prodr.* 179.

TEMPERATE HIMALAYA; alt. 5–10,000 ft., from Wuzuristan, *Stewart*; to Sikkim, *J. D. H.*

The prevalent scapigerous habit and obovate more entire leaves and the 3-nerved invol. bracts distinguish this from all forms of *S. chrysanthemoides* and *diversifolius*, but it is very variable in height, from 6 in. to 3 ft., and the cauline leaves especially vary from 2–3 in. and oblong contracted at the base to 6–7 in. with very dilated auricled bases. *Limb* of disk-fl. campanulate.

7. **S. obtusatus,** *Wall. Cat.* 3183; glabrous, stem or scape very slender almost naked, radical-leaves few elliptic or elliptic-lanceolate acute denticulate, cauline similar or the uppermost linear-oblong, heads few or many ¼–⅓ in. long 20–30-fld. campanulate bracteolate in lax corymbs with long slender branches and peduncles, invol. bracts oblong acute obscurely 3-nerved, ligules 8–10, achenes papillose all with white pappus. *DC. Prodr.* vi. 367; *Clarke Comp. Ind.* 192.

KHASIA and JYNTEA MTS; alt. 4–6000 ft., *De Silva, &c.*—DISTRIB. Khakyen hills east of Bhamo, in Birma.

A very distinct species, allied to *S. pallens*, but differing in the foliage, very slender habit, and small heads; limb of disk-fl. campanulate.

8. **S. zeylanicus,** *DC. Prodr.* vi. 365; very slender, puber lous, leaves very long narrow linear or dilated upwards acute or obtuse margins recurved entire or obscurely toothed, cauline few distant linear, heads very few often ⅓–½ in. diam. many fld. bracteolate campanu te very long peduncled in very

loose open corymbs, invol. bracts 16–20 linear-oblong 1–3-nerved suddenly ending in long points, ligules 16–20, achenes strongly ribbed glabrous all with white pappus. S. gracilis, *Arn. Pugill.* 31.

TRAVANCORE; Pulney Mts., *Wight.* CEYLON; elevated districts amongst high grass, alt. 7000 ft.

Root woody. *Stem* 1–2 ft., terete. *Leaves* lower 4–6 by $\frac{1}{8}$–$\frac{1}{3}$ in., rather thick, 1-nerved. *Peduncles* of heads erect, very slender, with setaceous bracts; limb of disk-fl. campanulate. *Achenes* slender, almost black, most minutely scabrid.

9. **S. nilgheryanus,** *DC. in Wight Contrib.* 23; *Prodr.* vi. 368; glabrous pubescent or sparsely cottony, stem strongly ribbed and angled leafy, lower leaves oblanceolate obtuse or 0, cauline sessile linear-oblong from a narrow or dilated auricled base margins flat or recurved toothed or sinuately-pinnatifid 1-nerved, heads not numerous $\frac{1}{3}$–$\frac{1}{2}$ in. diam. 30–40-fld. bracteolate campanulate very long peduncled in very loose open corymbs, invol. bracts 30–40 oblong subacute, ligules 10–15, achenes most minutely scabrid all with white pappus. *Wight Ic.* t. 1132; *Clarke Comp. Ind.* 198. S. Arnottianus, *DC. l.c.* 357.

NILGHERRY MTS.; alt. 7–8000 ft., *Wight,* &c.

Green or white with cottony pubescence. *Stem* 12–18 in., stout or slender. *Leaves* 3–5 in., very variable in width and in depth of cutting, sometimes rigid, scaberulous above.—Specimens from "about Avalanche" (McIvor), have densely crowded leaves, grey above and quite white beneath, as are the stems and corymbs, but not the involucre, limb of disk-fl. campanulate. *Achenes* as in *zeylanicus.*

** *Perennials, with a woody rootstock or branches. Disk-fl. with campanulate or funnel-shaped limb. Leaves narrow.*

10. **S. Griffithii,** *Hook. f. & Thoms.*; glabrous or pubescent, stem slender woody erect simple densely leafy below, leaves elongate crowded very narrow linear acute margins revolute upper shorter, heads 1–3 long peduncled $\frac{1}{2}$–1 in. diam. many-fld. bracteolate, invol. bracts 12–18 linear-oblong acute 1-nerved, ligules 8–14, achenes papillose or scabrid all with white or yellowish pappus. *Clarke Comp. Ind.* 194.

KHASIA MTS.,; alt. 5–7000 ft., *Griffith,* &c.

Stem 6–12 in. erect, or ascending from a woody stock, rarely forked. *Leaves* 1–$2\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., rarely dilated a little upwards, glabrous above, margins almost meeting beneath at the prominent midrib. *Peduncles* continuations of the stem, with scattered, small, erect, subulate leaves; ligules longer than the invol. bracts, bright yellow; disk-fl. with a narrow funnel-shaped limb.

11. **S. Kurzii,** *Clarke mss.*; dwarf, pubescent, rootstock and numerous stout short leafy branches woody, leaves crowded spreading and recurved linear obtuse or apiculate scaberulous, margins recurved, heads $\frac{1}{2}$ in. diam. solitary terminal many-fld. with 15–20 long linear-oblong acute nearly glabrous bracteoles, ligules 15–20, achenes scabrid all with white pappus. S. Griffithii, *var.* Kurzii, *Clarke Comp. Ind.* 194.

MARTABAN; granite rocks on the top of Moolee, *Parish*; and of Thoung-gyun, *Lobb.*

A singular little almost shrubby rigid species, 2–5 in. high. *Leaves* $\frac{1}{4}$–$1\frac{1}{2}$ in. long. *Bracteoles* half as long as the involucre and more, very slender.

*** *Annuals. Disk-fl. very slender. Leaves pinnatifid in all or entire in* S. dubius.

12. **S. coronopifolius,** *Desf.*; *Boiss. Fl. Orient.* iii. 390; annual, glabrous, slender, often much branched, leaves all cauline rather small and fleshy narrow pinnatifid, lower petioled, upper amplexicaul and auricled, heads few $\frac{1}{3}$ in. diam. many fld. long peduncled minutely bracteolate in lax corymbs, invol. bracts 15–20 narrow acute, ligules 8–12 revolute, disk corollas very slender,

achenes scabrid, pappus white. *DC. Prodr.* vi. 344; *Clarke Comp. Ind.* 194. S. subdentatus, *Ledeb. Ic. Fl. Ross.* t. 493, f. 2. S. chrysanthemifolius, *DC. Prodr.* vi. 345.

WESTERN HIMALAYA; Northern Kashmir and Kunawer, alt. 8–17,000 ft., *Thomson.* &c.—DISTRIB. Affghanistan and westwards to Spain.

Rather slender, stems often very many from the root, 6–18 in., branches erect or divaricating, leaves scattered, 1–2 in., rarely more.

13. **S. ramosus,** *Wall. Cat.* 3129 A.: annual, glabrous, stem simple or branched angled and grooved, leaves all cauline sessile linear-oblong pinnatifid, lobes obtuse bases simple or ½ amplexicaul and dilated, heads many ⅙–¼ in. diam. campanulate many-fld. subebracteolate long-peduncled in loose terminal corymbs, invol. bracts 12–15 slender acuminate margins scarious, ligules 6–8 minute, achenes slender hairy. *DC. Prodr.* vi. 365; *Clarke Comp. Ind.* 195.

SIKKIM TERAI, ASSAM, SILHET and MISHMI; *Roxburgh,* &c.

Stem 10–24 in. *Leaves* 1–3 in. *Heads* very small.—Clarke suggests that this may be a tropical form of *S. vulgaris,* but the small heads and the invol. bracts and achenes are very different. It is not described in Roxburgh, but there is in the Benthamian Herbarium a specimen communicated by that botanist to Dr. Forsyth. —*S. vulgaris* in Wight's Herbarium from the Nilgherry Mts. is no doubt an escape, and Thomson has garden specimens from Moradabad.

14. **S. pedunculatus,** *Edgew. in Trans. Linn. Soc.* xxi. 74; annual, dwarf, glabrous, stem and branches slender terete, leaves all cauline pinnatifid lobes linear divaricate base simple or dilated and ½-amplexicaul, heads ⅙ in. diam. many-fld. narrowly campanulate subebracteolate long peduncled in loose irregular corymbs, invol. bracts 10–16 linear acuminate, ligules very short, achenes slender glabrous or nearly so, pappus white. *Clarke Comp. Ind.* 195. S. pedunculatus *and* dubius, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 9–12,000 ft., *Jacquemont.* &c. WESTERN TIBET; alt. 9–13,000 ft., *Thomson,* &c.

Usually 6–18 in. high, slender and very much branched from the base, with slender spreading leaf-lobes and small laxly corymbose heads. The roughness of the achenes requires a very high power to render it visible. Clarke suggests (l.c. 196) that *S. pedunculatus* and *dubius* may perhaps be referable to *coronopifolius,* but they appear to me to differ no less in the heads than in the habit and foliage.

15. **S. dubius,** *Ledeb. Fl. Alt.* iv. 112; annual, dwarf, glabrous, branched from the base, leaves sessile or the upper auricled linear entire or sparingly pinnatifidly lobed, heads ¼ in. diam. many-fld. subcampanulate bracteolate subcorymbose, invol. bracts 12–16 linear-oblong green with acute purple tips and white margins, ligules 0, achenes hoary, pappus white. *DC. Prodr.* vi. 341; *Clarke Comp. Ind.* 195.

WESTERN HIMALAYA; northern Kashmir, alt. 9–13,000 ft., *Stoliczka.* WESTERN TIBET; Parang Pass, alt. 15–17,000 ft., *Thomson.* Rakas Thal, alt. 16,000 ft. *H. Strachey.*

Two to six inches high, with leaves often half the length of the plant.

16. **S. tetrandus,** *Ham. in Wall. Cat.* 3129 B.: annual, slender, glabrous, stem sub-angular or terete sometimes winged, leaves narrowly oblong from an auricled sometimes decurrent base irregularly pinnatifidly lobed, lobes subacute irregularly sparingly toothed, heads ¼ in. diam. many-fld. subcampanulate bracteolate subcorymbose, invol. bracts linear-lanceolate acuminate green with white margins glabrous, ligules overtopping the involucre, achenes scabrid, pappus white. *DC. Prodr.* vi. 365.

SIKKIM; plains at the foot of the hills, *Hamilton, Clarke.*

A weak usually straggling weed 4–8 in. high, flexuous, simple or branched, very

like *S. vulgaris*, but the heads are erect, and are not conical by the inflexion of the invol. bracts after flowering. It is very near *S. ramosus*, but the heads are rather larger and ligules longer. Perhaps both these are vars. of *S. ægyptius*, L.

SECT. II. **Pseudo-jacobæa.** *Heads* radiate, bracteolate; invol. bracts many-seriate, imbricate; fl. all pappose; anther-cells not tailed.—The habit and involucre of the species are peculiar; the flowers are those of S. Jacobæa.

17. **S. lavandulæfolius,** *DC. in Wight Contrib.* 23; *Prodr.* vi. 368; woolly, stems stout woody erect densely leafy unbranched, leaves 1 in. densely imbricate linear-oblong from a broad subauricled base obtuse, margins strongly recurved entire rarely toothed or 3-fid, heads ½ in. diam. campanulate in dense or open corymbs, invol. bracts 20–40 many-seriate closely imbricate, outer subulate or lanceolate acuminate, ligules 10–16 short, achenes slender glabrous shorter than the soft white pappus. *Wight. Ic.* t. 1133; *Clarke Comp. Ind.* 193.

NILGHERRY MTS.; in pastures, alt. 6–8000 ft., *Wight*, &c.

Stems from a woody stock, 6–12 in., very strict. *Leaves* thickly woolly, especially beneath, uniformly smaller upwards. *Corymbs* with stout erect branches and peduncles; heads glabrate or woolly.—This is a very anomalous plant, on account of the numerous many-seriate invol. bracts, in some heads about 20, all narrowly lanceolate, glabrate; in others up to 40 and tomentose, the inner broadly oblong; between these states there are all intermediates. One of Wight's specimens had been injured by an insect, and the leaves on the lower part of its stem are flat and irregularly cut, or even deeply trifid with acute spreading lobes; the uppermost are, however, as in all the numerous other specimens from 7 collectors, linear-oblong, quite entire, with strongly recurved margins, and are densely imbricate.

SECT. III. **Madaractis.** *Heads* turbinate or obconic, all radiate, usually bracteolate; invol. bracts 1-seriate; ligules broad and long, usually 4-nerved; anther-cells not tailed; ray-fl. (all in *S. belgaumensis*) epappose; pappus often shorter than the achenes, rigid, scabrid, often reddish, unequal, sometimes sub-biseriate, the outer hairs very short (pappus paleaceous below in *S. Grahami*). (See also *S. chrysanthemifolius*, var. *spectabilis* and *S. diversifolius*, both with epappose ray-fl.).

* *Leaves not white and cottony beneath, rarely pinnatifid.*

18. **S. linifolius,** *Clarke Comp. Ind.* 202; glabrous, stem herbaceous erect or ascending fastigiately leafy, leaves sessile elongate-linear subacute entire or distantly serrate base contracted not auricled 1-nerved, heads few bracteolate long-peduncled in lax corymbs, invol. bracts 15–20 ⅛ in. long linear-oblong acuminate, achenes slender glabrous equalling the red pappus. Doronicum linifolium, *DC. Prodr.* vi. 322. Aster odontophyllus *and* linifolius, *Wall. Cat.* 3285, 3287. Synanthera, *Wall. Cat.* 7132.

KHASIA MTS.; on rocky banks of streams, alt. 4–7000 ft.

Root perennial. *Stems* 8–18 in., often branched from the base, very smooth. *Leaves* 3–6 by ⅙–¼ in., green when dry, suberect and spreading, usually numerous and close set, having a fastigiate appearance, occasionally pinnatifidly lobed. *Ligules* 10–12, elliptic-oblong, longer than the invol. bracts. *Achenes* ⅛ in.; pappus not much longer, hairs slender, subequal, not cohering at the base.

19. **S. Gardneri,** *Thwaites Enum.* 167; glabrous, stem herbaceous erect or ascending subsimple, leaves sessile elongate-linear distantly serrate base contracted not auricled 1-nerved, heads few bracteolate long peduncled in lax-corymbs, invol. bracts 10–15 $\frac{1}{10}$ in. long linear-oblong acuminate glabrous, ligules 8–10 narrow, achenes short linear pubescent equalling the whitish or yellowish pappus. Doronicum Gardneri, *Clarke Comp. Ind.* 202.

CEYLON: Ambagamowa district, alt. 3–5000 ft., *Macrae, Thwaites.*

The habit, foliage and inflorescence of this are entirely that of *S. linifolius* and the pappus is the same, but the achenes are very much smaller and pubescent.

20. **S. saxatilis,** *Wall. Cat.* 3131; slender, pubescent, hirsute or glabrate, leaves sessile base auricled linear linear-oblong or elliptic-oblong acute or acuminate 1-nerved serrate, heads few ebracteolate long peduncled subcorymbose, invol. bracts 15–20 $\frac{1}{8}$ in. long oblong lanceolate acuminate, ligules 8–12, achenes linear slender glabrous longer than the whitish or reddish pappus. *DC. Prodr.* vi. 367. S. Rabani *and* pilosiusculus, *Clarke Comp. Ind.* 202, 203. S. Wightii, *Benth. in Gen. Pl.* ii. 248; *Clarke Comp. Ind.* 197. Doronicum Wightii, *DC. in Wight Contrib.* 23; *Prodr.* vi. 322; *Wight Ic.* t. 1124. Madaractis glabra, *DC. Prodr.* vi. 440. M. Metziana, *Schultz-Bip. in Herb. Hohenack.* n. 1011.

KHASIA MTS.; alt. 4–7000 ft. NILGHERRY MTS.; in moist pastures; *Wight,* &c.

A much more variable plant than *S. linifolius*, both as to foliage and hairiness, but always distinguishable from it by the auricled upper leaf-bases. Of the Khasian specimens, one form from river banks closely resembles *linifolius* in all other respects; another growing in drier places is very hispid and has broader leaves, both these have linear leaves 4–7 in. long and $\frac{1}{6}$–$\frac{1}{2}$ in. broad; a third very slender hispid form has short elliptic-lanceolate acute leaves, the lower only $1\frac{1}{2}$ in. long contracted into an auricled petiole. The whole plant smells of sweetbriar when bruised. Of the Nilgherry specimens the two most divergent forms are a tall stout coarse glabrous one 2–3 ft. high, much corymbosely branched above, with petioled toothed elliptic-lanceolate lower leaves and coarsely-toothed cauline leaves with broad auricled bases; and a more slender simpler one, with all the leaves smaller and regularly crenate-toothed and elliptic-lanceolate. Between these there are all intermediates, and each has subsidiary varieties which imitate the Khasian ones in greater or less degree. The pappus-hairs are all long and rather slender in this species.

?21. **S. Mishmi,** *Clarke Comp. Ind.* 203; stem glabrous angular, leaves sessile with broad amplexicaul bases produced backwards broadly oblong acute glandular-pubescent on both surfaces denticulate or subentire, heads large almost glabrous in long angular bracteolate peduncles, invol. bracts 10–14 narrowly oblong acute margins white, ligules long flat, achenes narrowly oblong 5-angled glabrous much shorter than the slender white pappus.

UPPER ASSAM; Mishmi hills, *Griffith.*

I have seen no specimens of this, which is described from a fragment a foot long in the Calcutta Herbarium, and Mr. Clarke has no further information to give respecting it; its tailless anther-cells and epappose ray-fl. place it in this section.

22. **S. polycephalus,** *Clarke Comp. Ind.* 197; herbaceous, pubescent hispid or scabrid, leaves all sessile obovate-oblong or linear or lanceolate regularly crenately serrate, lower 3–5-nerved upper with dilated auricled bases, heads few or many bracteolate long-peduncled corymbose, invol. bracts 10–15 $\frac{1}{3}$ in. long linear-oblong acuminate glabrous or pubescent, ligules 8–10, achenes linear glabrous or scabrid nearly equalling the red pappus. Madaractis polycephala, *DC. Prodr.* vi. 440. Doronicum Arnottii, *DC. in Wight Contrib.* 23; *Prodr. l. c.* 322; *Wight Ic.* t. 1125.

NILGHERRY MTS.; alt. 6–7500 ft., on the northern slopes, *Wight,* &c.

A coarse herb 10–18 in., often branched corymbosely from the very base, with stout branches and thickish leaves, very brown when dry. *Leaves* 1–3 in., usually regularly crenate-toothed with rather thickened margins. *Ligules* very broadly oblong, equalling the invol. bracts. *Achenes* slender, often $\frac{1}{6}$ in. long, from quite glabrous to very scabrid, as in Wight's figure.

23. **S. Lessingianus,** *Clarke Comp. Ind.* 198; herbaceous, hispidly pubescent, leaves all sessile and auricled linear-oblong deeply acutely serrate or

toothed, heads $\frac{3}{4}$–1 in. diam. many-fld. turbinate long-peduncled bracteolate, invol. bracts 10–15 $\frac{1}{5}$ in. long linear-oblong acuminate hispid, ligules 8–10 very broad, achenes linear scabrid equalling the red pappus. Doronicum Lessingianum, *Wight & Arn. in Arn. Pugill.* 106; *DC. Prodr.* vi. 322; *Wight Ic.* t. 1126. Madaractis scabra, *DC. l. c.* 439.

Nilgherry Mts.; alt. 6–8000 ft., *Wight*, &c.

Closely allied to *S. polycephalus* and as coarse, always hispid, with more numerous more reniform leaves which are very deeply toothed.

** *Leaves not white and cottony beneath, pinnatifid.*

24. **S. ludens,** *Clarke Comp. Ind.* 199; herbaceous, hirsute puberulous scaberulous or glabrate, stem strict or slender, leaves polymorphous simple or more often lyrate-pinnatifid with broadly auricled bases or petioles, terminal lobe ovate or orbicular-ovate or -cordate lobulate and toothed lateral small gashed or 0, heads ecalyculate irregularly corymbose on stout or slender peduncles, invol. bracts 12–16 $\frac{1}{6}$ in. long linear-oblong acuminate usually glabrous, ligules 8–10 broadly oblong, achenes quite or nearly glabrous or hispid slender equalling the dirty-white pappus. Doronicum Walkeri, *Arn. Pugill.* 32; *DC. Prodr.* vi. 322; *Thwaites Enum.* 167.

The Concan; Bababoodan and Wattikely hills, alt. 5000 ft., *Law*, &c. Ceylon; central province, alt. 5–7000 ft., *Walker*, &c.

A most sportive plant; some of the Concan specimens are very stout, a foot high with a much branched stem as thick below as the little finger and leaves with the terminal lobe 2½ in. diam.; others have flexuous leafy unbranched stems with long petioled leaves reduced to the terminal lobe, others have oblong leaves 4–5 by 1 in., uniformly pinnatifid with oblong ascending toothed lobes. The Ceylon forms are often as stout, but more often slender, less branched and less leafy than the Concan ones, with sometimes a very few small elliptic petioled toothed leaves $\frac{1}{2}$–1 in. long, without auricled bases, and the stem produced into a very slender forked scape bearing 2–4 subcorymbose heads, on filiform peduncles. A very singular small apparently prostrate Ceylon form, probably growing in water, has slender stems emitting long roots, and rather recurved rhomboid petioled toothed leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long, and single or but few heads. The achenes are rarely as described by Clarke villously hairy; I can sometimes detect only minute hairs, at others short spreading ones, and at others none at all; they are about $\frac{1}{10}$ in. long and contracted below the top. Clarke's name is a very applicable one, but that of *Walkeri* should have been retained.

25. **S. Hohenackeri,** *Hook. f.*; glabrous puberulous or scabrid, stem woody very stout and much branched below, branches short ascending herbaceous above leafy, petiole not auricled, leaves small deeply pinnatifid segments few short acute toothed or lobed margins recurved, heads long-peduncled bracteolate, invol. bracts 10–15 $\frac{1}{6}$ in. long lanceolate acuminate rigid glabrous or scabrid, ligules 6–10, achenes slender more or less scabrid nearly equalling the red pappus. S. pinnatifidus, *Clarke Comp. Ind.* 198. Madaractis pinnatifida, *DC. Prodr.* vi. 439. Doronicum Candolleanum, *Wight & Arn. in Arn. Pugill.* 108; *DC. Prodr.* vi. 322; *Wight Ic.* t. 1127. D. rupestre, *Wight Ic.* t. 1128.

Nilgherry and Shevagherry Mts.; alt. 7–8000 ft., *Wight*, &c., in pastures.

Root and stout branched stock as thick as the little finger; branches rather slender very many 3–6 in. *Leaves* $\frac{1}{2}$–1 in.; petiole short, slender or 0. *Achenes* $\frac{1}{10}$ in.; pappus hairs all long or with a few short ones.

26. **S. tenuifolius,** *Burm. Fl. Ind.* t. 60, f. 4; annual, slender, herbaceous, glabrous, much branched, leaves sessile pinnatifid or sub-2-pinnatifid, lobes very slender spreading obtuse, heads few long-peduncled ebracteolate in divaricating corymbs, invol. bracts 10–12 $\frac{1}{8}$ in. long obovate-oblong acute membranous glabrous, ligules 6–10, achenes broader upwards scabrid equalling the

reddish or yellowish pappus. S. multifidus, *Willd. Sp. Pl.* iii. 1986; *DC. Prodr.* vi. 365; *Wall. Cat.* 3135; *Clarke Comp. Ind.* 198. S. laciniosus, *Arn. Pugill.* Doronicum tenuifolium, *Wight Ic.* t. 1129.

WESTERN PENINSULA; on the dry hills of the Western Ghats, from the Concan southwards.—DISTRIB. Java.

A slender much branched annual, or like most annuals reduced to a single weedy stem. *Achenes* $\frac{1}{10}$ in. This has more of the habit of sect. *Jacobæa* than the others of this section. Wight suspects that this and *S. Hohenackeri* are varieties of one species, but the achenes and invol. bracts are quite different, besides this being an annual.

27. **S. hewrensis,** *Hook. f.*; annual, dwarf, puberulous or scaberulous, leafy, leaves sessile or shortly petioled base auricled lanceolate or oblong-lanceolate obtuse obtusely coarsely irregularly toothed or subpinnatifid membranous, heads ebracteolate on capillary axillary and subcorymbose peduncles, invol. bracts 8–10 $\frac{1}{6}$ in. long narrowly oblong rather dilated upwards acuminate glabrous, ligules 3, achenes broader upwards scabrid equalling the dirty-white pappus. Doronicum hewrense. *Dalz. in Dalz. & Gibs. Bomb. Fl.* 130.

The CONCAN; rocky places near Jooneer, common, *Dalzell.*

A remarkable little species, differing in habit from its allies. the heads with capillary peduncles being as often axillary and solitary as corymbose, the invol. bracts very few, and ligules (constantly according to Dalzell) only 3. *Achenes*, as in *S. tenuifolius*, $\frac{1}{10}$ in. long, slender; pappus hairs all long and slender.

*** *Leaves more or less white with cottony tomentum beneath.*

28. **S. Edgeworthii,** *Hook. f.*; herbaceous, stem leaves beneath and corymbs white with dense cottony pubescence, leaves petioled cordate or rhomboid or ovate-lanceolate obtuse or acute irregularly toothed lobulate or crenate many-nerved glabrous or scabrid above margins more or less recurved, petiole auricled, heads on short or long naked peduncles turbinate bracteolate corymbose, invol. bracts $\frac{1}{6}$–$\frac{1}{4}$ in. oblanceolate acuminate cottony, ligules 10–14, achenes elongate turbinate scabrid about equalling the white pappus. S. tomentosus, *Clarke Comp. Ind.* 200. Madaractis lanuginosa, *Edgew. in Trans. Linn. Soc.* xx. 75. Doronicum tomentosum, *Wight in Calc. Journ. Nat. Hist.* vii. 155; *Ic.* t. 1151.

CENTRAL INDIA, *Jacquemont*; rocks at Mandu on the Vindhya range, *Edgeworth.* CANARA; Bababooden hills, *Law, Dalzell,* &c. NILGHERRY MTS.; on the N.W. slopes, *Wight.*

The Canara and Nilgherry specimens are stout erect leafy with stiff grooved stems from a stout woody perennial stock, and have shortly petioled angular stiff coriaceous leaves 1–1$\frac{1}{2}$ in. long, with scabrid upper surface and prominent nerves beneath; the heads are very many-fld., and the cottony bracts are dilated upwards with very broad membranous margins. Edgeworth's specimens, which are very imperfect, are very slender, with naked shining stems, much more membranous leaves with longer more slender petioles and smaller heads with much narrower invol. bracts. Jacquemont's specimens have the habit of the Concan ones, but the narrow invol. bracts of Edgeworth's, and the deeply cordate leaves are unlike either of the others. The achenes in all are about $\frac{1}{8}$ in., ribbed and scabrid; pappus-hairs slender, most of them subequal and long with a few intermixed much shorter ones.

29. **S. Dalzellii,** *Clarke Comp. Ind.* 201; herbaceous, erect, much branched, branches and leaves beneath more or less cottony, leaves sessile linear or lanceolate apiculate base contracted or dilated and auricled coriaceous 1-nerved margins recurved entire or rarely denticulate, heads bracteolate long-peduncled in dichotomous corymbs, invol. bracts 10–12 $\frac{1}{8}$ in. long oblanceolate

acuminate scabrid without white margins, ligules 10–15 narrow, achenes small scabrid about equalling the white rigid subbiseriate pappus.

The CONCAN; Bababooden hills, *Law, Dalzell.*

Stem 1–2 ft., rigid, angled and grooved, branches erect. *Leaves* 2–3½ in., the broadest ⅓ in. diam., narrowed to both ends, auricles rounded or 0, very leathery, smooth or scabrid above. *Heads* numerous; peduncles with a few minute bracts. *Achenes* (immature) $\frac{1}{16}$ in., turbinate; pappus-hairs very rigid, scabrid, some very short.

30. **S. Lawii,** *Clarke Comp. Ind.* 201; very slender, excessively branched, stem branches and leaves beneath more or less white and cottony, leaves lower or most petioled lanceolate irregularly coarsely toothed with the petiole not auricled, upper or most sessile linear entire or obscurely toothed with an auricled base, heads bracteolate turbinate or capillary axillary and solitary or terminal and subcorymbose peduncles, invol. bracts 12–15 $\frac{1}{10}$ in. long obovate acuminate puberulous, ligules 8–10, achenes small scabrid equalling the white subbiseriate pappus.

Hills of the CONCAN (or MYSORE?); Severndroog talooka, *Dalzell,* &c.

Very closely allied to *S. Dalzellii,* but much more slender, with capillary peduncles to the smaller heads. I suspect, however, that these characters will not prove constant, the achenes and pappus being identical. The only "Severndroog talooka" I can find is in Mysore (W. of Hydrabad), where I doubt Dalzell having ever been.

31. **S. Grahami,** *Hook. f.*; erect, much branched, slender, branches glabrous or scaberulous, leaves rhombic-ovate narrowed suddenly into a short simple or lobulate petiole irregularly coarsely toothed white and cottony beneath with broad green veins, heads solitary and axillary or subcorymbose on very slender peduncles bracteolate, invol. bracts 12–18 ⅙ in. long obovate-oblong acuminate pubescent, ligules 10–12 elongate, achenes obconic scabrid equalling the double white pappus of long paleaceous and short setaceous hairs. S. reticulatus, *Clarke Comp. Ind.* 199. Doronicum reticulatum, *Wight in Calc. Journ. Nat. Hist.* vii. 156; *Ic.* t. 1151, B. Madaractis arachnoidea, *Herb. Calc.*

BOMBAY; Tanna district; *Graham, Law,* &c.

Herbaceous, 2–3 ft. *Leaves* 1–2½ in. long, 5-nerved at the base; petiole of lower often as long, slender, exauricled, of the upper shorter, often broadly winged, auricled, *Peduncles* with setaceous bracts. *Ligules* ½ in., linear. *Invol. bracts* without white margins. *Achenes* of the ray curved, linear, compressed, smooth, of the disk ⅛ in. long, turbinate, angled, ribbed and strigose, much longer than the pappus, the long rigid hairs of which are flattened and taper from a broad base.—Nothing can be more foreign to the character of *Senecio* than the pappus of this plant, which is however clearly related closely to *S. Lawii* and *S. belgaumensis,* &c.

32. **S. Gibsoni,** *Hook. f.*; erect, much branched, branches slender scaberulous, leaves ovate-lanceolate or subrhomboid apiculate sessile or narrowed into a broadly winged auricled petiole sinuate-toothed glabrous or scaberulous above grey beneath with appressed cottony down nerves slender, heads ecalyculate on very slender peduncles in lax dichotomously branched corymbs, invol. bracts 15–18 $\frac{1}{12}$ in. long obovate-oblong acuminate puberulous, ligules 8–10 long narrow, achenes obconic glabrous longer than the scanty whitish pappus of rigid scabrid long and short hairs.

The CONCAN and CANARA; Bababooden hills, *Law, Dalzell.*

This very much resembles *S. Grahami,* but the leaves are narrower, more membranous, with much shorter petioles and are not white beneath, the heads are much smaller and the achenes though of the same form and length are glabrous, and the pappus-hairs are not at all paleaceous.

33. **S. belgaumensis,** *Clarke Comp. Ind.* 200; erect, much branched, branches slender glabrous or pubescent, leaves rhombic-ovate narrowed into a broad auricled petiole acute coarsely toothed or gashed white and cottony beneath except the nerves, heads ecalyculate on long capillary loosely irregularly corymbose peduncles, invol. bracts 12–18 $\frac{1}{10}$ in. long obovate-oblong acuminate pubescent, ligules 8–10, achenes turbinate ribbed scabrid epappose. Madacarpus belgaumensis, *Wight in Calc. Journ. Nat. Hist.* vii. 157; *Ic.* t. 1152; *Dalz. & Gibs. Bomb. Fl.* 130. ? Doronicum reticulatum, *Dalz. & Gibs. l. c.*

The DECCAN; Belgaum, *Law, Dalzell*, colouring the walls of the fort (at Jilwan?) yellow, *Ritchie.*

So similar to *S. Grahami* in habit and foliage that Clarke (Comp. Ind.) suggests its being an epappose state of that plant, which suggestion, he informs me, he withdraws in favour of its nearer affinity to *S. Edgeworthii.* From *Grahami*, it differs chiefly in the much smaller involucral bracts, only $\frac{1}{10}$ in. long, and more capillary peduncles, as well as the absence of pappus, and from the Concan and Nilgherry form of *S. Edgeworthii* it differs in being apparently annual, in its slender habit, in the shape texture and clothing of the undersurface of the leaves, in the much smaller invol. bracts without broad membranous margins, and in the shorter more turbinate achenes; but it approaches more Edgeworth's very imperfect specimen from Mandu. Some of Dalzell's specimens of *S. belgaumensis* with a tall erect stem 4–6 ft. high, furnished throughout with short spreading branches bearing lax corymbose heads, differ wholly in habit from the genus. In Dalzell and Gibson's Flora *Doronicum reticulatum* (*S. Grahami*, nob.), is described as having no pappus, which obliges me to quote it under this species, but I suspect this is a blunder, specimens from the habitat ascribed to their *D. reticulatum*, "Island of Caranjah" (in Bombay harbour) would clear up this point.

SECT. IV. **Ligularia.** Perennial herbs with long petioled very broad orbicular reniform or palmate radical leaves, and cauline leaves with large sheaths. *Heads* large, nodding or deflexed, racemose or corymbose; invol. bracts 1-seriate in insertion, of two forms, the narrower outer overlapping both margins of the broader inner. *Achenes* glabrous, usually equalling or exceeding the pappus, all pappose. The Indian species are all Himalayan with one Khasian (see also genus *Cremanthodium*).

* *Leaves not palmately lobed; heads many, corymbose or in corymbose racemes.*

34. **S. amplexicaulis,** *Wall. Cat.* 3139; very robust, nearly glabrous, leaves orbicular-reniform cordate or subhastate toothed, petiole of lower long simple or interruptedly winged, of upper with a broad sheathing wing, heads many-fld. corymbose or in corymbose racemes base broad, invol. bracts about 8 connate below oblong acute glabrous, ligules 5–6 very long, achenes narrow shorter than the rufous pappus. *Clarke Comp. Ind.* 204. S. Yakla, *Clarke l. c.* Ligularia amplexicaulis *and* corymbosa, *DC. Prodr.* vi. 314.

WESTERN HIMALAYA; alt. 9–13,000 ft., from Kashmir to Garwhal. SIKKIM; at Yakla, alt. 16,000 ft., *Clarke.*

Stem 2–4 ft., as thick as the thumb below. *Leaves* 1 ft. diam. and less, teeth regular and alternately smaller. *Heads* drooping, campanulate, corymbose in flower, racemed after flowering, branches of corymb pubescent; invol. bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; ligules $\frac{1}{2}$–$\frac{3}{4}$ in., slender; disk-fl. with slender tube longer than the short campanulate limb. *Achenes* $\frac{1}{5}$ in. long, glabrous.—The Sikkim specimens are smaller than the N. Western and the disk corollas have a much shorter tube in proportion to the limb.

35. **S. Thomsoni,** *Clarke Comp. Ind.* 205; robust, glabrous below, above glabrous or cottony, leaves orbicular hastate or cordate toothed, petiole of lower not winged slender, heads 5–6-fld. corymbose or in subpanicled corymbs

base narrow, invol. bracts 5–6 linear-oblong free acute glabrous, ligules 1–2 very long, achenes narrow equalling the white pappus.

WESTERN HIMALAYA; Kashmir, alt. 7–10,000 ft., *Thomson, Watt.*

Stem 3–4 ft., more slender than in *S. amplexicaulis. Leaves* 10 in. diam. and under, orbicular and deeply cordate with rounded lobes, or more often hastate with decurved or spreading lobes. *Corymbs* very variable, axils with long linear bracts. *Heads* suberect and drooping; bracteoles linear or filiform; invol. bracts ½ in. long; ligules ¾ in. *Achenes* ¼ in. long, glabrous.

36. **S. pachycarpus,** *Clarke mss.*; stout, erect, nearly glabrous, pubescent above, leaves ovate-cordate toothed, petiole of radical long winged wing toothed, cauline with a dilated sheath, heads many-fld. drooping base broad, invol. bracts 10–12 oblong connate at the base, ligules very long, achenes short broad equalling the reddish pappus. S. corymbosus, *Clarke Comp. Ind.* 205, *not of DC.*

SIKKIM HIMALAYA; alt. 10–14,000 ft., *Clarke.*

The only specimen I have seen is very mutilated; its heads are smaller than in *S. amplexicaulis,* which is apparently its nearest ally, and from which it is best distinguished by its small heads and small broadly obovate-oblong achenes ⅙–⅕ in. long, and short pappus.

** *Leaves palmately lobed, heads corymbose.*

37. **S. macranthus,** *Clarke Comp. Ind.* 205; very robust, nearly glabrous, leaves palmately or subpedately 7–9-lobed to near the base, lobes oblong gashed and toothed, petiole of radical long not winged, of cauline with a basal sheath, heads very few and large corymbose on long naked peduncles many-fld., base broad ebracteolate, invol. bracts 6–10 very unequal and irregularly connate, ligules very long narrow, achenes narrow glabrous nearly equalling the red pappus.

KHASIA MTS.; alt. 5–7000 ft., *J. D. H. & T. T.*

Stem 3–5 ft., as thick as the thumb below. *Leaves* reniform in outline, 12–18 in. diam. *Heads* campanulate, ebracteolate; invol. bracts ¾–1 in., some lanceolate acuminate, others broadly ovate obtuse or acute, with membranous overlapped margins; ligules 2 in. long; disk-fl. with a long slender tube and short limb. *Achenes* ⅓ in.

38. **S. Mortoni,** *Clarke Comp. Ind.* 208; stem above and corymb puberulous, leaves palmately 5–11-lobed lobes gashed and toothed, petiole of the radical long not winged, of the cauline with a basal sheath, heads many large narrow 5–6-fld. bracteolate base very narrow, invol. bracts 3–5 linear-oblong acute or obtuse free to the base, ligules 0, achenes narrow glabrous equalling or exceeding the red pappus.

EASTERN HIMALAYA; E. Nipal. Sikkim and W. Bhotan, alt. 9–12,000 ft, *J. D. H., Clarke.*

Stem 3–4 ft. *Leaves* reniform in outline, 18 in. diam. and under. *Corymbs* much branched, very broad; heads erect, fascicled; bracteoles linear, revolute; invol. bracts ½ in. long, 2-seriate, outer narrower, inner broader with wide membranous borders; tubes of disk-corollas about equalling the campanulate limb. *Achenes* ¼–¾ in., smooth.—The campanulate limb of the disk-corolla is not, as Clarke describes, much shorter than the tube, nor are the achenes ½ in. long. It is named after a grandson of the illustrious Roxburgh, Depy. Comm. of Sikkim in 1870.

*** *Leaves not lobed. Heads in simple or rarely branched racemes or solitary.*

39. **S. Ligularia,** *Hook. f.*; glabrous, or cottony above, stout, erect, leaves cordate-sagittate or subdeltoid or reniform obtuse or acute coarsely toothed, petiole of the lower long simple, of the upper winged and sheathing,

heads many-fld. subsecund in a solitary terminal simple raceme pendulous, base narrow, invol. bracts oblong acute free to the base, ligules several very long, achenes narrow longer than the reddish pappus. S. sibiricus, *Ledeb. Fl. Ross.* vi. 238; *Clarke Comp. Ind.* 206, *not of Linn.* S. racemosus, *Wall. Cat.* 3140. Ligularia sibirica, *Cass. in DC. Prodr.* vi. 315. L. racemosa, *DC. l.c.* 314.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir to Sikkim, alt 9–12,000 ft. —DISTRIB. Siberia, Dahuria, Japan.

Very variable: stem sometimes as thick as the thumb, usually less. *Leaves* 1 ft. diam. and under, lateral lobes produced outwards and subtriangular or rounded off, basal sinus shallow or deep. *Heads* numerous, bracteolate or not; bracts at the bases of the peduncles small or large and leafy; invol. bracts 8–10, outer narrow acute, inner broad with broad overlapped membranous margins; ligules ½–¾ in., tube of disk-fl. equalling the campanulate limb. *Achenes* ⅓ in. long.—Described by Ledebour as very variable, the heads being sometimes small with very few flowers in Siberian specimens. I have adopted the subgeneric name for this species, it being the most widely distributed of the old genus *Ligularia.*

VAR. *Atkinsoni*; heads smaller, bracts at the base of the peduncles filiform, ligules very short, pappus dirty-white. S. Atkinsoni, *Clarke Comp. Ind.* 207. —Sikkim, at Yakla, alt. 12,000 ft., *Clarke.* The specimen of this is a very poor one.

40. **S. Jacquemontianus,** *Benth. in Gen. Pl.* ii. 449; glabrous, robust, leaves broadly ovate-cordate or subhastate obtuse toothed sinus open, petiole of lower stout winged, of cauline sheathing, heads numerous peduncled in a conical raceme broadly campanulate, invol. bracts 8–12 oblong acute bases subconnate, ligules many long and broad, achenes linear-oblong, pappus very short coroniform. *Clarke Comp. Ind.* 208. Senecillis Jacquemontiana, *Dcne. in Jacq. Voy. Bot.* 90, t. 98.

WESTERN HIMALAYA; Kashmir, alt. 10–13,000 ft., *Falconer, Jacquemont.*

Stem stout, 3–5 ft. *Leaves* 1 ft. broad and under, tip acute or rounded; petiole 5–15 in., wing narrow or broad and gashed or toothed. *Racemes* 4–8 in., elongating in fruit; heads not secund; peduncles curved, 1–2½ in., lower with oblong leafy bracts at the base; bracteoles under the heads few, filiform; heads 1½–2 in. across the ligules; invol. bracts ⅓ in. glabrous; ligules 12–15, ½–¾ in. long, 5–9-nerved, tip entire or toothed; tube of disk-corollas shorter than the limb. *Achenes* ⅓ in. long, deeply grooved; pappus-hairs $\frac{1}{16}$ in., unequal, united at the base.

41. **S. retusus,** *Wall. Cat.* 3142; stem short glabrous puberulous above, leaves reniform or nearly orbicular toothed, petiole of lower stout not winged, middle cauline with a broad sheath uppermost cauline small oblong-lanceolate sessile, heads solitary or 2–8 in a simple terminal raceme many-fld. nodding base broad usually ebracteolate, invol. bracts 10–12 oblong acute or obtuse, ligules many short broad 3-toothed, achenes linear smooth shorter than the whitish pappus. *Clarke Comp. Ind.* 206. Ligularia retusa, *DC. Prodr.* vi. 314.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 12–15,000 ft., *J. D. H.*, &c.

Stem 12–18 in., stout or slender. *Leaves* 8 in. diam. and under, tip rounded or retuse, sinus deep or shallow, middle cauline sometimes ovate-cordate. *Heads* broad and short, 1½ in. diam.; tube of corolla of disk-fl. very short. *Achenes* ¼ in.; pappus rather scanty, fugaceous.

42. **S. calthæfolius,** *Hook. f.*; slender, glabrous, leaves reniform or broadly ovate-cordate toothed, sinus deep, petiole of lower very slender not winged of middle cauline with a narrow sheath, uppermost cauline small sessile oblong-lanceolate, heads solitary or 2–5 in simple terminal racemes many-fld. base broad, invol. bracts 8–10 oblong obtuse bases connate, ligules many slender, achenes unripe smooth shorter than the reddish pappus.

SIKKIM HIMALAYA; at Kongra-Lama, alt. 14-15,000 ft., *J. D. H.*

A very slender species, 10–18 in. high; root with copious long erect fastigiate fibrous remains of old leaves 2–3 in. long. *Leaves* 3 in. diam. and less; petiole of lower often as long as the stem, very slender. *Heads* with 1–2 linear bracteoles; invol. bracts $\frac{1}{3}$–$\frac{1}{2}$ in., rather membranous when dry; ligules $\frac{3}{4}$ in. long, tip entire or minutely toothed; tube of disk-corolla equalling the limb. *Achenes* unripe, $\frac{1}{6}$ in.—A very distinct species, but looks as if drawn up amongst grass, &c.

43. **S. arnicoides,** *Wall. Cat.* 3138, *in part*; stout, erect, glabrous or sparingly cottony above, leaves oblong ovate or elliptic obtuse toothed, lower narrowed into the stout petiole which is winged above, cauline sessile amplexicaul or with a sheathing petiole, heads solitary or 2 or more in simple or branched racemes large broad many-fld. drooping base very broad, invol. bracts 14–16 oblong acute bases connate, ligules many short broad, achenes shorter than the whitish pappus. *Clarke Comp. Ind.* 207. Ligularia arnicoides, *DC. Prodr.* vi. 314; *Royle Ill.* t. 60, f. 2.

CENTRAL and WESTERN HIMALAYA, alt. 12–14,000 ft.; Nipal, *Wallich*; Garwhal, *Falconer*, &c.; Kunawer and Lahul? *Thomson.*

Stem stout, 12–18 in. *Leaves* variable, largest 8 by 5 in., coriaceous. *Heads* sometimes $2\frac{1}{2}$ in. diam., broadly campanulate; invol. bracts $\frac{3}{4}$ in. long, 12–14; ligules 15–30, $\frac{3}{4}$ in. long, 7–11-nerved, tips entire or minutely toothed; tube of disk-corollas shorter than the narrow limb. *Achenes* $\frac{1}{4}$ in., broader upwards; pappus rather scanty.—Specimens with single head approach *Werneria Ellisii* very much, in which, however, the heads are erect and the bracts connate to above the middle.

VAR. *frigida*; dwarf, 6–10 in., very stout, leaves chiefly radical very coriaceous, heads solitary, invol. bracts glabrous or tomentose. Ligularia frigida, *Schultz-Bip. in Herb. Hook.*—Kunawer and Western Tibet; Nubra, Ladak, &c., alt. 15–17,000 ft.

SERIES B. Anther-cells tailed; tails contiguous or connate.

SECT. V. **Synotis.** *Heads* few or many-fld; flowers all pappose; invol. bracts 1-seriate.

* *Climbing, leafy shrubs or undershrubs.*

44. **S. araneosus,** *DC. Prodr.* vi. 364; climbing, glabrous or sparsely cottony, leaves petioled cordate acuminate entire or sub-3-lobed toothed or sinuate-toothed 5–7-nerved, petiole not auricled, heads $\frac{1}{3}$–$\frac{1}{2}$ in. long bracteolate in open axillary and terminal rounded corymbs, invol. bracts 8, ligules 0, achenes glabrous striate. *Clarke Comp. Ind.* 181, *excl. some syns.* S. arachnoideus, *Wall. Cat.* 3163. S. Walkeri, *Arn. Pugill.* n. 103; *DC. l. c.*; *Wight Ic.* t. 1131. S. corymbosus, *var. β, Thwaites Enum.* 167. Cissampelopsis volubilis, *Miq. Fl. Ind. Bat.* ii. 103. Cacalia? volubilis, *Blume, DC. l. c.* 331.

WESTERN HIMALAYA; from Sikkim to Mishmi, alt. 5–7000 ft. KHASIA MTS., alt. 2–5000 ft. NILGHERRY MTS., *Wight.* CEYLON; Central Province, alt. 7–8000 ft., *Walker*, &c.—DISTRIB. Java.

An extensive climber; branches grooved. *Leaves* 3–7 by 2–5 in., coriaceous or membranous, finely reticulated. *Invol. bracts* linear-oblong, subacute, with a thickened mesial band and pale margins. *Pappus* white.—Very variable in foliage. I find no difference between the South Indian and some Sikkim specimens; the Khasian have often much larger more lobed leaves.

45. **S. corymbosus,** *Wall. Cat.* 3121; climbing, leaves petioled orbicular- or ovate-cordate acute denticulate 5–7-nerved glabrous above densely cinnamomeous-tomentose beneath, petiole not auricled, heads $\frac{1}{3}$–$\frac{1}{2}$ in. long in dense axillary and terminal rounded corymbs, invol. bracts 8, ligules 0, achenes glabrous striate. *DC. in Wight Contrib.* 22; *Prodr.* 364; *Wight Ic.* t. 1130.

NILGHERRY MTS., *Noton*, *Wight*, &c. CEYLON; Central Province, alt. 7–8000 ft., *Walker*, &c.

Both Thwaites and Clarke consider this and *S. araneosus* to be co-specific, but I find no intermediate states; the leaves of this are smaller, more rounded and coriaceous, less acuminate, and thickly tomentose beneath; the heads are dense, and anther-tails usually shorter.

46. **S. Buimalia,** *Ham. in Don Prodr.* 178; climbing, branches leaves beneath and inflorescence cottony, leaves petioled ovate-cordate acuminate sinuate-toothed or entire 3-5-nerved, petiole not auricled, heads $\frac{1}{2}$–$\frac{2}{3}$ in. long bracteolate few in axillary rounded corymbs, invol. bracts about 8 linear-oblong, ligules few, achenes glabrous. *DC. Prodr.* vi. 369; *Clarke Comp. Ind.* 182. S. scandens, *Wall. Cat.* 3120. Cacalia volubilis, *Herb. Ham.*

Central and Eastern Himalaya; Nipal, *Wallich*; Sikkim, alt. 5-6000 ft., *J. D. H.*

Branches grooved. *Leaves* 3–5 by 2–3 in., glabrous above. *Invol. bracts* linear-oblong, with a thickened tomentose mesial band, and thin glabrous borders. *Ligules* short, yellow. *Achenes* $\frac{1}{6}$ in., slender, angled; pappus $\frac{1}{3}$ in., white.

47. **S. scandens,** *Don Prodr.* 178; climbing, glabrous or branches and leaves beneath slightly pubescent, leaves hastate or ovate-hastate acuminate entire crenate or toothed, petiole short auricled, heads $\frac{1}{3}$ in. long in lax divaricate rounded corymbs, invol. bracts 10-12 linear-oblong acute, ligules few or many. S. campylodes, *DC. Prodr.* vi. 370; *Wall. Cat.* 3170; *Clarke Comp. Ind.* 183. S. stipulatus *and* Wightianus, *DC. l. c.*; *Wight Ic.* t. 1136. S. intermedius, *Wight Ic.* t. 1135. S. flexicaulis, *Edgew. in Trans. Linn. Soc.* xx. 74. S. flexuosus, *Wall. Cat.* 3110. S. chinensis, *DC. l. c.* 363. S. Hindsei, *Benth. in Hook. Journ. Bot.* i. 488. Cineraria repanda, *Lour. Fl. Cochin.* 501. C. chinensis, *Spreng. Syst. Veg.* iii. 549.

Temperate Himalaya; Kumaon, alt. 6–7000 ft., *Edgeworth*; Nipal, *Wallich*. Sikkim, alt. 6–10,000 ft., *J. D. H.* Khasia Mts., alt. 5-6000 ft. Pulney and Nilgherry Mts., alt. 7500 ft., *Wight*, &c. Ceylon; Central Province, *Walker*, &c.—Distrib. Yunan, China.

Branches zig-zag, grooved or ribbed. *Leaves* 3–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., usually membranous, sometimes pinnate below in Ceylon specimens; auricles of petiole very variable. *Invol. bracts* with thin margins. *Achenes* $\frac{1}{10}$ in., slender, 4-angled or -ribbed; ribs hairy or glabrous, outer compressed curved.

48. **S. candicans,** *DC. in Wight Contrib.* 22; *Prodr.* vi. 369; branches angled and leaves beneath densely white-tomentose, leaves ovate-cordate or -hastate acuminate toothed glabrous or cottony above, petiole short auricled, heads $\frac{1}{3}$ in. long bracteolate in axillary and terminal rounded corymbs or lax panicles, invol. bracts linear acute tomentose, ligules few, achenes pubescent. *Wight Ic.* t. 1134; *Wall. Cat.* 3123. S. campylodes, *var.* candicans, *Clarke Comp. Ind.* 184. Cacalia sarmentosa, *Lesch. mss.*

Nilgherry Mts., alt. 4–7000 ft., *Wight*, &c.

Very near *S. scandens*, and united with it by Clarke; but, besides the woolly covering, the branches are more uniformly angled and ribbed, the leaves more coriaceous, and the achenes smaller and more pubescent. I have seen no intermediates.

49. **S. tetranthus,** *DC. Prodr.* vi. 370; climbing, nearly glabrous, leaves ovate-cordate or -lanceolate acuminate serrate membranous, petiole pubescent not auricled, heads $\frac{1}{6}$–$\frac{1}{4}$ in. long in bracteolate axillary and terminal thyrsiform panicles 4-fld., invol. bracts 5–6 short oblong obtuse glabrous, ligules 2, achenes glabrous. *Clarke Comp. Ind.* 185. S. cordatus, *Wall. Cat.* 3109.

Temperate Himalaya; Nipal, *Wallich*; Sikkim, alt. 7–8000 ft., *J. D. H.*

Branches terete. *Leaves* 5–7 by $1\frac{1}{2}$–3 in., often caudate-acuminate, sometimes orbicular-cordate and 4 in. diam. *Heads* shortly peduncled. *Achenes* $\frac{1}{12}$ in.; pappus white or reddish, much shorter than the tubular corollas.

** *Herbs or undershrubs with large radical or subradical or cauline leaves, flexuous scapes or stems, and panicled racemose or thyrsoid (not corymbose) inflorescence.*

50. **S. Wallichii,** *DC. Prodr.* vi. 364; sparsely pubescent, leaves radical long-petioled broadly ovate-cordate acuminate sinuate-toothed membranous, scape almost leafless pubescent or woolly above, heads $\frac{1}{3}$ in. long bracteolate narrow 5-fld., invol. bracts 5 oblong obtuse, ligules 2, achenes glabrous. *Clarke Comp. Ind.* 184. S. dentatus, *Wall. Cat.* 3112.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 7–10,000 ft., *J. D. H.*, &c.

Stem 2–3 in., woody, slender. *Leaves* 8-10, 3–7 by 2–4 in.; petiole slender, 4–6 in. *Scape* 12-24 in., with a few small leaves near the base or 0, flowering at the top only. *Heads* in thyrsoid corymbs, shortly pedicelled. *Achenes* slender, $\frac{1}{10}$ in. long; pappus white, much shorter than the tubular corollas.

51. **S. alatus,** *Wall. Cat.* 3114; glabrous pubescent or cottony, stem short or long simple stout, leaves ovate-cordate or -lanceolate acuminate serrate membranous, petiole long with broad toothed wings, stem beyond the leaves elongate simple or branched, heads $\frac{1}{2}$ in. long ebracteolate about 6-fld. in very large branched thyrsoid panicles, invol. bracts 4–7 linear obtuse pubescent, ligules 2, achenes glabrous or puberulous. *DC. Prodr.* vi. 368; *Clarke Comp. Ind.* 185.

TEMPERATE HIMALAYA; from Simla, alt. 6–9000 ft., to Sikkim, alt. 7–13,000 ft.

Whole plant 1–2 ft. or more; stem below sometimes as thick as a swan's quill and shaggy, either very short with subradical leaves, or elongate with alternate leaves, rarely branched, ending in a pubescent or cottony erect often widely branching flower-scape. *Leaves* 5–12 by 4-6 in.; petiole short or long, its wing dilated in the middle or sometimes at the base, where it is broadly auricled. *Heads* shortly pedicelled. *Achenes* $\frac{1}{10}$ in., slender, and pappus much as in *S. Wallichii.*

52. **S. Candolleanus,** *Wall. Cat.* 3119; stem slender flexuous glandular-pubescent simple or branched, leaves long-petioled ovate acute coarsely toothed white-tomentose beneath, heads $\frac{1}{4}$ in. long 6–7-fld. narrow ebracteolate in terminal peduncled panicles, invol. bracts 5 linear-oblong membranous glabrous, ligules 0, achenes pubescent. *DC. Prodr.* vi. 364; *Clarke Comp. Ind.* 137.

WESTERN HIMALAYA; Kumaon, *Blinkworth*; Pindari, alt. 11,500 ft., *Strach. & Winterb.*

Stem 12–18 in., or branches terminating in a peduncled panicle, flexuous, and red. *Leaves* 1–2 by $\frac{1}{2}$–1 in., glabrous above; petiole slender. *Achenes* (ripe not seen); pappus much shorter than the tubular corollas. This species has the inflorescence and flowers of *S. Levingii* and *alatus*, with the leafy stem and foliage of *S. Kunthianus.*

53. **S. Levingii,** *Clarke Comp. Ind.* 301; glabrous, tall, leafy, leaves deltoid angles acuminate toothed membranous suddenly contracted into a broad short cuneate petiole, heads $\frac{1}{2}$ in. bracteolate 5-fld. in long peduncled axillary or terminal secund panicled racemes, invol. bracts 5 narrow-linear acute glabrous, ligules 0, achenes glabrous.

WESTERN HIMALAYA; Kashmir, alt. 8–10,000 ft., *Falconer, Thomson, Levinge.*

A very handsome species, 2–3 ft. high. *Leaves* 4–7 in. across the angles, very membranous. *Heads* sessile or peduncled and drooping, flowers three times as long as the involucre; anthers far exserted. *Achenes* sometimes as long as the involucre; pappus much shorter than the corollas, white.—Habit of section *Ligularia*, and near the Siberian *S. hastatus* (Cacalia hastata, *L.*), which has long-tailed anthers.

54. **S. quinquelobus,** *Hook. f. & T.*; herbaceous, glabrous or sparsely pubescent, stem simple long slender erect flexuous, leaves petioled membranous

cordate or subreniform and 3–7-angled or palmately lobed, angles or lobes coarsely sinuate-toothed and teeth acute and apiculate, petiole slender not auricled, heads narrow 5–6-fld. bracteolate long-peduncled drooping in simple or branched long slender racemes, invol. bracts 5–6 linear membranous, ligules 0, achenes slender glabrous shorter than the scanty white pappus. *Clarke Comp. Ind.* 209. Prenanthes ? quinqueloba, *Wall. Cat.* 3261; *DC. Prodr.* vi. 195.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 10–12,000 ft.

Root perennial; stem grooved, 2–3 ft., naked below. *Leaves* 2–4 in., sometimes as broad as long or even broader, rather glaucous beneath, uppermost not cordate. *Racemes* a foot long and less, very slender, sometimes quite simple with secund bracteate peduncles bearing solitary terminal heads and bulb-like leaf-buds in the axils; or the peduncle becomes an elongated branch bearing many bulbils. *Invol. bracts* obtuse or acute, green; corolla large, tube shorter than the campanulate limb; anthers exserted, with very short tails. *Achenes* $\frac{1}{10}$ in., tip dilated.

55. **S. chenopodifolius,** *DC. Prodr.* vi. 364; herbaceous, finely pubescent above, stem branched naked below, leaves membranous triangular-cordate or obscurely 3-lobed acuminate irregularly sinuate-toothed angles and teeth apiculate, petiole slender base broadly auricled, heads small numerous subsecund 3-fld. fascicled on the slender branches of panicled racemes, invol. bracts 3–5 minute, ligules 0, achenes glabrous shorter than the copious brown pappus. *Clarke Comp. Ind.* 209. Mikania chenopodioides, *Wall. Cat.* 3175.

CENTRAL and WESTERN HIMALAYA; from Kashmir, alt. 7000 ft., *Falconer, Stewart*, to Nipal, *Wallich*.

Stem 2–4 ft., rather stout, but soft, terete, often flexuous. *Leaves* 3–5 in. long and often as broad, base truncate or cordate, subglaucous beneath. *Racemes* very slender, panicled; heads $\frac{1}{4}$ in. long, very shortly peduncled, drooping; invol. bracts $\frac{1}{10}$ in., oblong, pubescent, much smaller than the corollas, the slender tube of which equals in length the inflated limb; anthers hardly exserted. *Achenes* turbinate, unripe $\frac{1}{16}$ in. long.

*** *Erect herbs with leafy stems or branches and terminal broad corymbs.*

56. **S. Kunthianus,** *Wall. Cat.* 3118; stem erect glabrous or puberulous leafy simple or corymbosely branched above, leaves short-petioled ovate- or elliptic-lanceolate acute coarsely toothed white-tomentose beneath, heads $\frac{1}{3}$ in. long many-fld. bracteolate campanulate in broad terminal corymbs, invol. bracts 5–8 narrow acute glabrescent, ligules 5–7, achenes pubescent. *DC. Prodr.* vi. 369; *Clarke Comp. Ind.* 186.

TEMPERATE HIMALAYA; from Kashmir, alt. 10–14,000 ft., to Sikkim, alt. 12,000 ft.

Stem stout, often glandular, red when dry. *Leaves* $1\frac{1}{2}$–3 by $\frac{1}{2}$–1 in., smooth and glabrous above, snowy-white beneath. *Heads* peduncled. *Achenes* $\frac{1}{8}$ in.; pappus copious, white, as long as the tubular corollas.

57. **S. acuminatus,** *Wall. Cat.* 3107; pubescent above, stem corymbosely branched, leaves shortly petioled elongate-lanceolate caudate-acuminate finely serrate glabrous on both surfaces, nerves reticulate, heads $\frac{1}{3}$ in. long 2–3-fld. bracteolate narrow in terminal and axillary long-peduncled corymbs, invol. bracts 3–5 linear-oblong obtuse glabrous, ligule solitary minute, achenes glabrous. *DC. Prodr.* vi. 368; *Clarke Comp. Ind.* 187.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 8–10,000 ft., *J. D. H.*

An erect herb, 2–3 ft.; stem rather flexuous, obtusely angled. *Leaves* 5–7 by $\frac{3}{4}$–$1\frac{1}{2}$ in., rather thin, base acute. *Heads* very numerous; flowers twice as long as the involucre. *Pappus* reddish, equalling the tubular corollas.

**** *Shrubby, heads in axillary and terminal corymbs.*

58. **S. densiflorus,** *Wall. in DC. Prodr.* vi. 369; shrubby, branches leaves beneath and corymbs clothed with appressed white rarely grey cottony wool, leaves large petioled narrowly or broadly elliptic- or obovate-lanceolate acuminate toothed, heads $\frac{1}{4}$ in. long many-fld. bracteolate in axillary peduncled and terminal branched subpanicled corymbs, invol. bracts 8–12 linear acute tomentose, ligules 8–10, achenes glabrous. *Clarke Comp. Ind.* 185. S. uncinellus, densiflorus, *and* angulosus, *DC. l. c.* 368, 369. S. aureus *and* angulosus, *Wall. Cat.* 3113, 3117. Solidago densiflorus, *Wall. Cat.* 1821.

CENTRAL and WESTERN HIMALAYA; from Nipal to Bhotan, alt. 5–7000 ft. KHASIA MTS., alt. 4–6000 ft. BIRMA, *Parish.*

Branches stout. *Leaves* 5–9 by 1–3½ in., glabrous or cottony above, teeth often hooked; petiole ¼–1 in., with often small broad toothed auricles. *Heads* campanulate, shortly peduncled; invol. bracts white, opaque; receptacle pitted and bristly; ligules very short. *Achenes* $\frac{1}{14}$ in.; pappus equalling or shorter than the tubular corollas, white.

VAR. *Parishii*; corymbs panicled on a stout prolongation of the branch none axillary.—Birma, Nat Toungin, *Parish.*

VAR. ? *Lobbii*; nerves of leaves beneath with red-brown tomentum (as in *S. rufinervis*), heads panicled as in var. *Parishii* but larger with longer ligules.—Martaban, Thoung Gyne, alt. 5000 ft., *Lobb.*

VAR. ? *mishmiensis*; softly cottony, branches angled, leaves as in the type, heads fewer broader on longer peduncles, invol. bracts longer.—Mishmi hills, *Griffith.*—Specimens very imperfect.

59. **S. rufinervis,** *DC. Prodr.* vi. 369; shrubby, branches leaves beneath and corymbs clothed with appressed white cottony wool, leaves petioled oblong-ovate or elliptic acute or acuminate sharply toothed, base rounded cordate or acute, nerves beneath with red tomentum, heads $\frac{1}{3}$ in. long many bracteolate 8–10-fld. in lax branched panicled corymbs, invol. bracts 5–8 oblong acute very much shorter than the flowers, ligules 4–5 short, achenes glabrous.

WESTERN HIMALAYA; from Simla to Kumaon, alt. 6–8000 ft.

Habit of *S. densiflorus*, and foliage as large, but nerves red beneath, base often rounded or even cordate, petiole usually much longer, heads much narrower, with very few flowers and very short glabrous or pubescent broader invol. bracts that are not $\frac{1}{3}$ the length of the expanded corolla, and receptacle very narrow.

60. **S. Bhot,** *Clarke Comp. Ind.* 187; shrubby, stem strongly ribbed and angled, branches and corymbs loosely cottony, leaves sessile lanceolate acuminate sharply toothed or serrate nearly glabrous, heads ½ in. diam. many-fld. in axillary and terminal subsessile corymbs with stout angled and ribbed divaricate branches, invol. bracts 8–10 linear-oblong acute green glabrous, ligules 9–14, achenes large ribbed glabrous.

BHOTAN, *Griffith.*

Branches with very prominent angles and ribs. *Leaves* (upper alone seen) 3–6 by 1–1½ in., rather membranous, base narrowed rounded. *Corymbs* with singularly stout ribbed divaricate branches and peduncles; invol. bracts rigid, with a few basal green rather large and broad bracteoles; receptacle smooth, convex; ligules very short. *Achenes* $\frac{1}{10}$ in. and upwards; pappus white.—A very singular species; the specimens are past flower, and the exact number of ligules is not ascertainable.

61. **S. vagans,** *Wall. Cat.* 3108; quite glabrous, stem and branches long slender, leaves petioled ovate- or elliptic-lanceolate more or less toothed, heads $\frac{1}{3}$ in. very narrow ebracteolate in very loose axillary and terminal few-flowered corymbs with long filiform branches and peduncles, invol. bracts about 8 linear-

oblong acute or obtuse glabrous, ligules 3–5, achenes glabrous. *DC. Prodr.* vi. 368. S. vagans, *var. β. Clarke Comp. Ind.* 188.

NIPALESE HIMALAYA; central region, *Wallich*; eastern region, Tambur river, alt. 6–8000 ft., *J. D. H.*

One of the few perfectly glabrous Indian species of the section. *Branches* below terete, above often ribbed or angled. *Leaves* 3–5 by 1–2 in., thin, with slender nerves, base narrowed into the short petiole. *Heads* on almost capillary peduncles, drooping; bracts at the forks of the corymbs setaceous; invol. bracts much shorter than the flowers. *Achenes* ⅛ in., very slender.

62. **S. triligulatus,** *Ham. in Don Prodr.* 178; glabrous except sometimes the corymbs, stem and branches long and slender, leaves petioled ovate-lanceolate caudate-acuminate more or less serrate membranous, heads ¼ in. long few-fld. ebracteolate in rounded axillary and terminal much branched corymbs with short slender branches and peduncles, invol. bracts 8 short linear-oblong obtuse, ligules 3–4, achenes glabrous. *DC. Prodr.* vi. 368. S. vagans, *var. α. Clarke Comp. Ind.* 188. Solidago floribundus, *Wall. Cat.* 3111.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H.*, &c.; Bhotan and Mishmi, *Griffith*.—DISTRIB. Birma.

Habit of *S. vagans*, but corymbs very different, rounded with shorter branches and peduncles, and heads much shorter, leaves with longer points.

63. **S. Simonsii,** *Clarke Comp. Ind.* 188; glabrous, branches flexuous terete, leaves shortly petioled broadly elliptic acute toothed glabrous shining beautifully reticulated, heads small ebracteolate 8–16-fld. in axillary corymbs and a terminal leafy panicle, invol. bracts 7–10 oblong subacute glabrous, ligules 0, achenes 5-angled glabrous, pappus white.

ASSAM, *Simons*.

I have seen no specimen; Clarke describes it as a very handsome plant with leaves 4–5 in. long.

DOUBTFUL AND EXCLUDED SPECIES.

S. ? PEGUANUS, *DC. Prodr.* vi. 365; an altogether doubtful plant, which cannot be determined without a reference to the Candollean Herbarium.

S. ANDERSONI, *Clarke Comp. Ind.* 104, does not occur near the limits of British India.

80. OTHONNOPSIS, *Jaub. & Spach.*

Glabrous leafy undershrubs. *Leaves* alternate, sessile, fleshy. *Heads* peduncled, solitary or panicled on the shortened leafy branches, heterogamous, radiate or disciform, yellow; outer fl. ♀, 1-seriate, fertile, ligule entire or 3-toothed or 0; disk-fl. ☿, sterile, tubular, limb 5-fid. *Involucre* ovoid or campanulate; bracts 1-seriate, oblong, bases subconnate; receptacle flat, naked. *Anther-bases* entire. *Style-arms* of ☿ linear, tip truncate penicillate. *Achenes* of ♀ oblong, obscurely 5–10-ribbed, pubescent or villous; of ☿ slender, empty, glabrous; pappus hairs of ♀ copious, ∞-seriate, slender, white; of ☿ scanty.—DISTRIB. Species 8, N. and S. Africa, and S. W. Asia.

1. **O. intermedia,** *Boiss. Fl. Orient.* iii. 414; branches strict erect, leaves oblong elliptic or linear-oblong rarely subspathulate obtuse or acute quite entire, heads subsolitary long-peduncled, invol. bracts elliptic or lanceolate shorter than the ligules, achenes pubescent. *Clarke Comp. Ind.* 210.

WUZARISTAN, alt. 6–7000 ft., *Stewart*.—DISTRIB. Westward to Persia.

A shrub, 1–3 ft. high, with woody erect leafy branches and white bark. *Leaves* 1–2½ in., obscurely 3-nerved, coriaceous when dry. *Heads* numerous, ¾–1 in. diam.; peduncles 1–3 in., stout, terminal and sublateral, erect, naked, a little swollen below

the subturbinate base of the involucre; bracts variable in width; ligules yellow.—This is not a native of Scind, as stated in the Genera Plantarum, Stock's specimens being collected in Beluchistan.

81. **WERNERIA,** *H. B. & K.*

Characters of *Senecio*, but heads (of the Indian species) without outer basal bracts, and the invol. bracts connate below into a cup.—DISTRIB. Species about 17 Andean, and 1 Abyssinian.

1. **W. nana,** *Benth. in Gen. Pl.* 451; leaves small elliptic-ovate or orbicular obtuse quite entire, ligules not much exceeding the densely woolly involucre. Ligularia nana, *Dcne in Jacq. Voy. Bot.* 91, t. 99; *Clarke Comp. Ind.* 210.

WESTERN TIBET; Kiobrung Ghat, *Jacquemont*; Rajhote (N. of Kumaon), alt. 16,000 ft., *Strach. & Wint.*

Stem simple, stout, 4–6 in. high from a creeping rootstock, base with a membranous sheath. *Radical leaves* ½–1 in., broadly oblong or suborbicular, on long stout petioles, thick, quite entire, nerves very obscure; cauline 2–3, ½-amplexicaul, concave and sheathing below. *Head* solitary, erect, 1–1¼ in. diam., subhemispheric; peduncle stout; involucre very densely woolly; bracts about 16, united halfway up, obtuse, glabrous and veined within; ligules yellow, 3-nerved; style-arms linear, ½-cylindric, obtuse. *Achenes* glabrous; pappus rather scanty, ¼ in. long, white.

2. **W. Ellisii,** *Hook. f.*; leaves large elliptic obtuse toothed, ligules twice as long as the woolly and hairy involucre.

WESTERN HIMALAYA; Chumba, *R. Ellis.*

Root tuberous with very thick fibres. *Leaves* very coriaceous, 3–5 by 2–2½ in., quite glabrous; nerves numerous, spreading; base narrowed into the very stout flexuous petiole 2–3 in. long. *Scape* with 2–3 shorter-petioled smaller leaves, tomentose, and, like the broad involucre, densely villous with black cellular curly hairs; head 2½ in. diam.; invol. bracts about 16, connate to above the middle, ovate-lanceolate, acute; ligules 1 in. *Style-arms* with broad conical tips. *Achenes* glabrous; pappus copious, ¼ in., white, reddish at the base.—In the connate invol. bracts this and *W. nana* technically accord with the genus *Werneria*, but in many respects they seem to approach both to *Senecio*, sect. *Ligularia*, and to *Cremanthodium*, differing from the former in foliage, and from the latter in the erect heads.

TRIBE VIII. **CALENDULACEÆ.**

82. **CALENDULA,** *Linn.*

Annual or perennial herbs. *Leaves* alternate, entire or sinuate-toothed. *Heads* terminal, peduncled, heterogamous, rayed, yellow or orange; ray-fl. ♀, 1–2-seriate, fertile, ligules entire or 3-toothed; disk-fl. ☿, sterile, tubular, limb dilated shortly 5-fid. *Involucre* broad; bracts 1–2-seriate, linear, acuminate, subequal, margin often scarious; receptacle flat, naked. *Anther-bases* sagittate, auricles acuminate or tailed. *Style-arms* of ☿ undivided. *Achenes* glabrous, of the ray incurved, 2–3-seriate, heteromorphous, outermost often empty, the next broader often winged, inner shorter; of the disk slender, empty; pappus 0.—DISTRIB. Species about 10, S. Europe, N. Africa, and W. Asia.

1. **C. officinalis,** *Linn.*; *DC. Prodr.* vi. 451; annual, erect, hispidly pubescent, lower leaves spathulate quite entire, upper lanceolate base cordate-amplexicaul toothed or subentire, achenes all curved boat-shaped dorsally muricate not beaked, outer larger ventrally crested scarcely beaked. *Clarke Comp. Ind.* 210; *Bot. Mag.* t. 3204.

Fields in the PUNJAB and SCIND, scarcely indigenous; Peshawur, *Aitchison.*—DISTRIB. Affghanistan, and westward to S. Europe.

Stem 12–18 in., corymbosely branched above. *Leaves* 1–3 in., acute, often hispid on both surfaces. *Heads* terminal, 2 in. diam. and under; invol. bracts $\frac{1}{4}$ in., incurved and appressed to the ripe achenes; ligules many, bright orange yellow, 3-toothed, tube hairy. *Achenes* longer than the involucre.

2. **C. arvensis,** *Linn.*; *Boiss. Fl. Orient.* iii. 418; annual, pubescent, radical leaves subspathulate entire, cauline lanceolate cordate-amplexicaul subentire or toothed, achenes all curved marginal dorsally echinate beaked, inner dorsally muricate. *DC. Prodr.* vi. 452; *Sibth. Fl. Græc.* t. 920.

KASHMIR, *Stoliczka.*—DISTRIB. S. Europe, W. Asia.

Habit of *C. officinalis*, but differing in the sulphur-coloured ligules and beaked achenes.—A doubtful native of India.

TRIBE IX. **CYNAROIDEÆ.**

83. **ECHINOPS,** *Linn.*

Thistle-like herbs, with white tomentum. *Leaves* alternate, pinnatifid, spinous. *Heads* in globose involucrate balls, blue or white, sessile or shortly stipitate on a common receptacle, 1-fld.; fl. ☿, all fertile, tube slender, limb with 5 slender segments. *Involucre* oblong; bracts ∞-seriate, rigid, pungent or some spinescent, outer shorter, inner spathulate, innermost linear or lanceolate, sometimes all connate into a tube with one long rigid spine on the outer side; receptacle minute. *Filaments* glabrous; anther-bases sagittate, auricles connate, tails short entire or fimbriate. *Style-arms* thick, and with a thick basal ring, at length spreading. *Achenes* elongate, usually villous; pappus crown of many short free or connate bristles.—DISTRIB. Species about 70, S. Europe, tropical and N. Africa, and Asia to Japan.

1. **E. echinatus,** *DC. in Wight Contrib.* 24; *Prodr.* vi. 526; stem branched from the base, branches wide-spreading and leaves beneath white with cottony wool, leaves sessile oblong pinnatifid, lobes triangular or oblong sinuate and spinescent, involucre surrounded by strong white bristles glabrous scaberulous villous or cobwebby above, balls 1–1$\frac{1}{2}$ in. diam. with many stout spines, outer invol. bracts 6–8 oblanceolate glabrous pungent one often spinescent, inner $\frac{1}{3}$ in. long connate tips ciliate, achenes $\frac{1}{6}$ in. long. *Roxb. Fl. Ind.* iii. 647; *Wall. Cat.* 2985; *Dalz. & Gibs. Bomb. Fl.* 131; *Clarke Comp. Ind.* 211. ? E. Griffithianus, *Boiss. Diagn.* 3, ii. 39; *Fl. Orient.* iii. 434.

UPPER GANGETIC PLAIN, NORTH WESTERN HIMALAYA, and the PUNJAB, from Benares westward, ascending to 5000 ft. in Sirmore. BEHAR, SCIND, and the DECCAN.—DISTRIB. Affghanistan.

A much branched spreading rigid annual, 1–2 ft. high, branched from the base. *Leaves* 3–5 in. long; spines often 1$\frac{1}{2}$ in. *Balls* of heads white. *Involucre* $\frac{1}{3}$ in. long, inner hardening around the obconic silkily villous achene.

2. **E. cornigerus,** *DC. Prodr.* vi. 525; stem erect simple, branches stout and leaves beneath densely cottony, leaves ovate-oblong or oblong pinnatifid or pinnate cobwebby above, segments deeply lobulate, lobules spinescent, balls 2$\frac{1}{2}$–3 in. diam. with or without projecting spines, outer invol. bracts narrowly oblanceolate glabrous surrounded by bristles 1 in. long, inner connate when ripe $\frac{2}{3}$ in. long, achenes villous narrowly obconic $\frac{1}{3}$ in. long. *Clarke Comp. Ind.* 211. E. coriarius, *Clarke l. c.* 212.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 6–9000 ft., *Royle*, &c. WESTERN TIBET, alt. 9–13,000 ft., *Falconer*, *Thomson*.

Stem very leafy. *Leaves* 4–8 in. *Balls* stoutly peduncled, often without spines.—

The erect habit and very large balls and involucres distinguish this at once from *E. echinatus.*

3. **E. niveus,** *Wall. Cat.* 2986; stem erect simple, branches and leaves beneath densely cottony, leaves bipinnatifid, segments narrow with long spines and revolute spinulose margins, balls 3 in. diam. spines usually included, outer invol. bracts oblanceolate spinescent, inner connate when ripe nearly 1 in. long. *DC. Prodr.* vi. 526; *Royle Ill.* t. 56, f. 1; *Clarke Comp. Ind.* 212.

NORTH WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 4–8000 ft.

The numerous very narrow much divided leaves, which are often recurved, best distinguish this from *E. cornigerus.*

84. ARCTIUM, *Linn.*

Tall coarse erect branched herbs. *Leaves* alternate or radical, broad, undivided. *Heads* terminal, sessile, solitary or fascicled, homogamous; fl. all similar, ☿, fertile, tubular, purplish, limb cylindric 5-fid. *Involucre* subglobose; bracts ∞-seriate, appressed, tips subulate spreading glochidiate; receptacle flat, densely bristly. *Filaments* glabrous; anther-bases sagittate; auricles small, tails setaceous. *Style-arms* linear with a basal pencil of hairs, or style pubescent below the arms. *Achenes* oblong, sub-3-quetrous, ∞-ribbed, glabrous, shining, truncate, base subequal; pappus hairs short, copious, serrulate, deciduous separately.—DISTRIB. Species 3 or 4, in temperate Asia and Europe.

1. **A. Lappa,** *Linn.*; leaves petioled ovate-cordate margins sinuate beneath hoary or glabrate, heads subcorymbose glabrous or cottony, invol. bracts subulate hooked, achenes angled and ribbed grey mottled with black. *Wall. Cat.* 2928; *Clarke Comp. Ind.* 212. Lappa major, *Gaertn., and* minor, *Schkuhr*; *Boiss. Fl. Orient.* iii. 457. L. tomentosa, *Lamk.*

WESTERN HIMALAYA; Kashmir to Simla, alt. 6–8000 ft., *Falconer*, &c. WESTERN TIBET, alt. 11–13,000 ft., *Thomson*, &c.—DISTRIB. Westwards to the Atlantic.

A tall coarse herb, 2–4 ft. *Leaves* often 1 ft., usually cottony beneath. *Heads* $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., stoutly peduncled; invol. bracts slender, rigid, angled, spreading; corolla and stamens purple, styles white.

85. COUSINIA, *Cass.*

Thistle-like herbs. *Leaves* alternate, toothed lobed or pinnatisect, spinescent. *Heads* solitary or crowded, rarely corymbose, homogamous; flowers all similar, ☿ (outer rarely neuter), tubular, yellowish white or purple; limb cylindric, slender, usually unequal, 5-fid. *Involucre* globose ovoid or oblong; bracts ∞-seriate, appressed with long erect spreading or recurved spinous tips, inner erect slender scarious; receptacle flat, densely bristly. *Filaments* glabrous; anther-bases sagittate, auricles connate, tails branched or villous. *Style-arms* narrow, short or long. *Achenes* glabrous, obovate oblong or obpyramidal, 5–∞-ribbed, compressed, basal areole straight; pappus hairs 1-seriate, slender or flattened, simple, free, caducous, rarely 0.—DISTRIB. Species about 120, Central and Western Asiatic.

* *Bristles of the receptacle quite smooth.*

1. **C. minuta,** *Boiss. Fl. Orient.* iii. 489; dwarf, annual, branches spreading usually decumbent, leaves sessile membranous hoary and cobwebby oblong or lanceolate sinuate-pinnatifid sparingly spinescent, heads small terminal and in the forks globose, receptacular bristles smooth, invol. bracts 15–20 triangular-lanceolate stout spreading and recurved, flowers yellow, achenes obovoid compressed 5–7-angled truncate with a crenulate ring, angles subcrenate. C.

calcitrapiformis, *Jaub. & Spach. Ill. Pl. Or.* ii. 157, t. 158; *Clarke Comp. Ind.* 213. C. avalensis, *Bunge Pl. Lehm.* 352.

The PUNJAB, at Hazara, *Stewart*, &c.—DISTRIB. Affghanistan, Beluchistan, and Persia.

A small rigid herb, with spreading branches. *Leaves* cobwebby on both surfaces. *Heads* small, numerous; invol. bracts stellately spreading. *Pappus* very deciduous, hairs scabrid.

** *Bristles of the receptacle more or less rough.*

2. **C. Thomsoni,** *Clarke Comp. Ind.* 213; tall, stout, erect, cottony, stem not winged, branched, radical leaves petioled linear deeply interruptedly pinnatifid cobwebby above densely white-tomentose beneath, segments horizontal triangular with a stout nerve and rigid long spine, cauline ovate-lanceolate sessile or auricled, heads 1½–2 in. diam. terminal peduncled, invol. bracts woolly numerous ⅓–1½ in. long triangular-lanceolate ending in a stiff spreading or recurved spine, inner linear scarious shining aristate, tip woolly, recept. hairs scabrid above, pappus scabrid. C. Brandisii, *Clarke l. c.* 215.

WESTERN HIMALAYA; from Lahul to Kumaon, alt. 10–14,000 ft., *Falconer*, &c.

Probably biennial; stem cottony all over, not shining. *Radical leaves* 5–10 by ¾–1¼ in.; segments sometimes forked or 3-sect at the base, with the lobes divaricating; midrib very stout and glossy. *Heads* suberect or nodding; invol. bracts variable in length and stoutness, very rigid; receptacular bristles ⅔ in.; corolla glabrous, ½–⅔ in. long (1 in Clarke). *Achenes* obovoid, glabrous.

3. **C. Falconeri,** *Hook. f.*; stout, erect, cottony, stem not winged branched, radical leaves petioled pinnatifid or ½-pinnatifid cobwebby above densely white-tomentose beneath, segments horizontal triangular or lanceolate simple or lobulate, tip and lobes spinescent, heads ½–2½ in. diam. sessile or subsessile solitary or fascicled, invol. bracts numerous woolly 1–1½ in. long subulate-lanceolate ending in a stiff erect or spreading spine, inner linear aristate scarious shining, recept. hairs scabrid above. Cirsium, sp. 15, *Herb. Ind. Or. H. f. & T.*

WESTERN TIBET, *Falconer*. KISHTWAR, alt. 11,000 ft. *Thomson*.

This is very near *C. Thomsoni*, but differs in the fascicled heads with straight invol. bracts, and in the broader usually less pinnatifid leaves with longer lobed segments.

4. **C. auriculata,** *Boiss. Fl. Orient.* iii. 502; cottony, stem corymbosely branched not winged, leaves glabrous or cobwebby above densely cottony beneath, radical oblong-ovate obtuse serrulate, cauline ovate or ovate-lanceolate sinuate or pinnatifid, tip and lobes strongly spinescent, heads 1–2 in. solitary peduncled, invol. bracts ¾–1½ in. base very small concave, spines very long stout spreading and recurved keeled deeply channelled above, inner scarious erect shining narrowly oblanceolate aristate margin above serrulate, receptacular bristles slender scabrid above twisted below.

TRANS-INDUS PLAINS, alt. 6000 ft., and KASHMIR valley (scarce). *Stewart*.—DISTRIB. Affghanistan.

The specimens are very imperfect, as are Griffith's, from which Boissier's description is taken. The pappus is, I think, very short or 0.

5. **C. microcarpa,** *Boiss. Fl. Orient.* iii. 496; biennial, sparsely cottony, stem rather slender dichotomously corymbosely branched and branches spinuously winged, leaves glabrate above cottony beneath, radical lyrate runcinate-pinnatifid segments toothed, cauline sessile linear-oblong irregularly pinnatifid and toothed, lobes and teeth spinescent, heads 1 in. diam. peduncled globose,

invol. bracts cobwebby triangular-lanceolate ½ in. long ending in very stout spreading flat keeled spines, innermost narrowly spathulate scarious shining apiculate serrate above, receptacular bristles scabrid, pappus 0. C. ? Hystrix, *Clarke Comp. Ind.* 214, *not of C. A. Meyer.*

KASHMIR, alt. 5–6000 ft., *Falconer*, *Thomson.*—DISTRIB. Affghanistan, Persia.

A slender species, well characterised by the runcinate radical leaves, winged stems, and absence of pappus.

86. **CARDUUS,** *Linn.*

Erect thistles. *Leaves* alternate, often decurrent, serrate-toothed or pinnatifid, spinescent. *Heads* solitary and long-peduncled or subsessile, scattered or crowded, homogamous; fl. all ☿ and fertile (rarely diœcious), white yellow or red, tube slender, limb equal or oblique 5-fid. *Involucre* ovoid hemispheric or globose; bracts ∞-seriate, appressed, erect spreading or recurved and spinescent or with a spinescent appendage; receptacle flat or convex, densely bristly. *Filaments* hairy or glabrous. *Anther-bases* sagittate, auricles connate, tails slender. *Style-arms* short, rarely filiform, obtuse. *Achenes* glabrous, obovoid, obtusely 4-angled, smooth or 5–10-ribbed, truncate or the top umbonate, basal areole nearly straight; pappus copious, hairs ∞-seriate, rigid, simple or barbellate, deciduous with a basal ring.—DISTRIB. Species about 30; temp. Europe, N. Africa and Asia.

1. **C. nutans,** *L.*; *Boiss. Fl. Orient.* iii. 515; biennial, cobwebby, tall, stem interruptedly winged, wings spinulous, leaves entire 1–2-pinnatifid waved spinous, heads ¾–1½ in. diam. solitary or fascicled hemispheric or subcampanulate inclined or drooping, invol. bracts subulate-lanceolate outer or all terminating in a spreading erect or reflexed spine, flowers crimson. *DC. Prodr.* vi. 621; *Reich. Ic. Fl. Germ.* 146; *Clarke Comp. Ind.* 215. C. lucidus, *Wall. Cat.* 2895.

WESTERN HIMALAYA; from Kashmir to Simla, alt. 6–12,000 ft.; and Hazara, in the PUNJAB. WESTERN TIBET; Nubra, alt. 13,000 ft., *Thomson.*—DISTRIB. N. Asia, and westward to N. Africa and W. Europe.

A tall stout thistle; stem 1–3 ft., usually simple, grooved, wing sinuous. *Leaves* 6–12 in., variable. *Achenes* pale brown, glabrous, granulate.—Thomson, as quoted by Clarke, remarks that the Himalayan plant is intermediate between *C. nutans* and *C. crispus*, L. (*C. acanthoides*, Sm.), which has smaller more erect fascicled heads: the fact is that the Indian specimens show every transition between the large stout form of *C. nutans* with subsolitary heads 1½ in. diam., which is its typical European state, and a more slender form with fascicled or solitary or subracemose or panicled heads ⅔–1 in. diam. The invol. bracts are erect or recurved, though not so strongly as in most Western forms. A specimen collected by Jaeschke in Lahul has fascicled globose heads 1 in. diam., with the invol. bracts all short and very strongly recurved. Most of the Indian specimens exactly accord with a supposed hybrid between *C. nutans* and *crispus* found near Munich, and called *C. acanthoides-nutans.*

2. **C. Thomsoni,** *Hook. f*; short, very robust, cottony or cobwebby above, leaves linear-oblong or lanceolate from a broadly auricled sessile base subpinnatifidly lobed strongly spinous very coriaceous shining, heads 2–3 in. diam. few fascicled or subcorymbose inclined densely woolly, invol. bracts short with a long strong spreading or recurved spine. Carduus ?, *Clarke Comp. Ind.* 215.

WESTERN TIBET; Ladak, alt. 12–13,000 ft., *Thomson.*

Annual; 12–18 in. high, leafy; stem simple, strongly ribbed. *Leaves* 6–8 in., lowest narrowed at the base, upper dilated, spines very strong horizontal. *Invol. bracts* 1 in. long, outer with spinulose margins; recept. bristles very dense, ¾ in. long; corolla very slender, glabrous, 1¼ in.; filaments quite glabrous; anther-bracts very long, laciniate. *Achenes* nearly ¼ in., glabrous; pappus hairs stiff, very unequal, longest 1¼ in.

87. **CNICUS**, *Linn.*

Characters of *Carduus*, but outer invol. bracts foliaceous and pappus hairs feathery (unequal with the longer clavellate in all the Indian species).—DISTRIB. Species about 150, all N. temperate regions.

SECT. I. *Heads* diœcious. *Corolla-limb* 5-partite. *Achenes* linear-oblong, compressed.

1. **C. arvensis**, *Hoffm.*; stem not winged cobwebby tomentose above, leaves sessile sinuate or pinnatifid, lobes divergent and tips spinescent tomentose beneath, heads solitary fascicled or corymbose, invol. bracts glabrate or cobwebby outermost short ovate or triangular-ovate ending in a short spine, inner gradually longer with undulate often recurved tips, innermost narrow linear-lanceolate scarious. *Clarke Comp. Ind.* 216. C. candicans, *Wall. Cat.* 2893, B. E. F. Cirsium arvense, *Scop.*; *DC. Prodr.* vi. 643; *Boiss. Fl. Orient.* iii. 552. C. Stocksii, *Boiss. Diagn.* 2, iii. 40. Carduus lanatus, *Roxb. Fl. Ind.* iii. 408. Aplotaxis cirsioides *and* A.? pungens, *DC. l. c.* 540, 539.

BENGAL and GANGETIC PLAINS, from the Sonderbunds north-westward to the PUNJAB. WESTERN HIMALAYA, from Kashmir to Kumaon. WESTERN TIBET, alt. 11–13,000 ft.—DISTRIB. N. Asia and westward to the Atlantic.

Erect; stems many from the perennial creeping roots, usually simple, leafy, 2–3 ft., the sexes forming separate tufts. *Leaves* 3–5 in., more or less woolly beneath. *Heads* variable or shortly peduncled, ♂ globose, ½–1 in. diam., ♀ much longer, more campanulate, with more lax invol. bracts; corolla dingy purple. *Achenes* smooth, shining; pappus brownish white.—A pest in English fields.

SECT. II. *Heads* bisexual. *Corolla-limb* 5-lobed. *Achenes* shortly oblong, compressed.

* *Invol. bracts all spinulose, inner not dilated at the tip.*

2. **C. involucratus**, *DC. Prodr.* vi. 639 (Cirsium), *excl. syn.*; tall, stout, erect, leaves setulose above white-tomentose beneath teeth and lobes spinescent, radical petioled pinnate, segments lanceolate sinuate-lobed or -toothed, cauline broader cordate-amplexicaul ovate or lanceolate pinnatifid, heads 1½–2½ in. diam. solitary or fascicled involucrate, invol. bracts glabrate all ending in slender erect or subrecurved spines or a few innermost linear acuminate, corolla 1 in. long. C. Eriophorus, *var.* involucratus, *Clarke Comp. Ind.* 217.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 8–12,000 ft.

Stem as thick below as the little finger, 2–6 ft. high, branched above. *Leaves*, radical a foot long, pinnatifid to the middle or deeper, or to the base with distant lobes. *Heads* inclined; corolla glabrous. *Achenes* ⅕ in. long, obovoid-oblong, margins obtuse; pappus ⅗ in., brown.—Western specimens of this have more rigid leaves, spinescent above, and longer stronger invol. spines than the Sikkim ones have. De Candolle describes the corollas as purple, which they appear to be when dry, but they are pale yellow-white when fresh. I have gathered in E. Nipal withered specimens of a plant like this, but with the leaves quite glabrous above and many rows of inner invol. bracts with soft reflexed flat wrinkled tips. I have also seen in Sikkim and the Khasia leaves supposed to belong to this species that are quite glabrous above.

VAR. *horrida*; more rigid, leaves more densely setulose above and spines much stronger.—Khasia Mts., alt. 5–7000 ft.; Kumaon, alt. 9000 ft., *Strach. & Winter.*

3. **C. argyracanthus**, *DC. Prodr.* 640 (Cirsium); stem cottony, leaves glabrous above cottony or glabrate beneath lobes and teeth strongly spinescent, radical petioled pinnatifid lobes rounded, cauline broader cordate-amplexicaul, heads ¾–1 in. diam. sessile densely fascicled involucrate, invol. bracts with woolly margins and long strong erect or spreading spines, innermost

linear acuminate, corolla ½ in. white. *Clarke Comp. Ind.* 218, *excl. var. β.* C. verutus, *Don Prodr.* 167? Carduus argyracanthus, *Wall. Cat.* 2903.

Temperate Himalaya, alt. 6–9000 ft., from Murree to Bhotan (excl. Sikkim).

A more slender plant than *C. involucratus*, with the leaves always glabrous above, and much more numerous smaller and densely fascicled heads. *Achenes* ⅛ in. long; pappus ½ in., nearly white.

4. **C. Falconeri,** *Hook. f.*; tall, very robust, stem villous, leaves membranous setose and spinescent above appressed cottony beneath teeth and lobes spinescent, cauline large broad ovate or ovate-lanceolate sinuate-lobed or subpinnatifid, head 2½–3 in. diam. subsolitary globose drooping densely woolly, invol. bracts very many lanceolate all ending in a long slender flexuous spine, corolla 1 in. C. horridus, *Clarke Comp. Ind.* 220, *not of Bieb.*

Western Himalaya; from Kashmir, *Falconer*, to Kunawar, *Jacquemont.*

A very fine species, of which I have seen no radical leaves. The heads resemble those of *C. Eriophorus*, but the weak spines of the invol. bracts at once distinguish it.

5. **C. eriophoroides,** *Hook. f.*; tall, stout, stem sparsely villous or cottony, leaves membranous glabrous cobwebby or setulose above cottony or glabrate beneath, lobes and teeth spinescent, radical petioled pinnatifid lobes broad lobulate, cauline large broad ovate or ovate-lanceolate sinuate-lobed, heads 2–3 in. diam. solitary or clustered densely woolly, invol. bracts lanceolate ending in soft long spines inner numerous linear acuminate, corolla 2½ in. C. Eriophorus, *Herb. Ind. Or. H. f. & T.*; *Clarke Comp. Ind.* 217.

Sikkim Himalaya; alt. 10–14,000 ft., *J. D. H.*

Very similar to *C. Falconeri*, but the heads are less globose, the invol. bracts fewer and many of the inner are soft linear and not spinescent, the corollas are longer. *Achenes* and pappus as in *C. involucratus.*

6. **C. Griffithii,** *Hook. f.*; robust, stem cottony, cauline leaves sessile or base auricled pinnatifid, lobes lanceolate acute spinescent setulose above white appressed-tomentose beneath, heads 2 in. diam. crowded glabrous, outermost invol. bracts short with acicular points, the rest linear wavy aristate or acuminate, corolla 1¼ in. long.

Upper Assam; Mishmi hills, *Griffith.*

This differs from all the previous described species in the long soft invol. bracts, which are extremely numerous, quite glabrous, none really spinescent, the points of the outermost being merely needle-like. The pappus is longer, fully 1 in. long. The achenes are as in *C. involucratus.*

** *Inner invol. bracts with dilated tips.*

7. **C. Wallichii,** *DC. Prodr.* vi. 643 (Cirsium); stem pubescent leafy, leaves sessile sinuate-pinnatifid lobes spinescent lobulate spines very long and strong glabrous above and beneath or cottony or tomentose beneath, heads ¾–1½ in. solitary and on naked peduncles or sessile fascicled and involucrate, outer invol. bracts lanceolate ending in appressed erect or recurved spines, inner with spreading or recurved more or less dilated, lanceolate or ovate spreading or recurved scarious serrulate acute or spinescent tips, corolla ⅔ in. long. C. carlinoides, *Cass. var. β, Herb. Ind. Or. H. f. & T.*

Temperate Himalaya; from Marri to Bhotan, alt. 6–12,000 ft. Nilgherry Mts., alt. 6000 ft.

An extremely variable plant, 4–10 ft. high, with spreading branches, which passes into *C. argyracanthus* through var. *Wightiana* in the Eastern Himalayas and the Nilgherries. The following varieties pass into one another in the most perplexing way. Corolla white, yellow or red (according to Clarke).

VAR. 1. *nepalensis*; leaves white-tomentose beneath, heads peduncled, inner invol. bracts with broadly dilated scarious reflexed tips in many series more numerous than the outer spiniferous ones, sometimes occupying two thirds of the head. Cnicus arachnoides, *Wall. Cat.* 2891. C. Wallichii, *Clarke Comp. Ind.* 219. Cirsium nepalense, *DC. Prodr.* vi. 642.

VAR. 2. *cernua*; more slender, leaves white-tomentose beneath, heads peduncled, inner invol. bracts in few series with narrowly dilated erect or reflexed tips, much fewer than the outer spiniferous ones and occupying nearly the whole head. C. argyracanthus, var. β, *Clarke Comp. Ind.* 218. C. cernuus, *Wall. Cat.* 2892. Cirsium Wallichii, *DC. Prodr.* vi. 643.

VAR. 3. *glabrata*; usually larger with more membranous leaves which are quite or nearly glabrous beneath, heads large fascicled or peduncled, inner invol. bracts numerous with long lanceolate or ovate spinescent tips.

VAR. 4. *fasciculata*; very spinous, leaves white-tomentose or cottony beneath, heads fascicled, inner invol. bracts with long lanceolate dilated spinescent tips.

VAR. 5. *platylepis*; very spinous, leaves sessile tomentose or glabrous beneath, heads usually fascicled, invol. bracts almost all short with broadly ovate spinescent tips.—Kashmir and Dras.

VAR. 6. *Wightii*; tall, much branched, leaves glabrous or nearly so beneath, heads large usually fascicled, inner row of bracts with dilated or hardly dilated lanceolate recurved tips. Cirsium argyracanthum, *Wight Ic.* t. 1137 8. C. macracanthum, *Schultz-Bip. in Herb. Hohenack.* No. 1019.—From Simla to Sikkim, alt. 8–10,000 ft., and Bhotan. This passes into *C. argyracanthum.* One Sikkim specimen has no obvious dilatation to the inner invol. bracts.

*** *Outer invol. bracts spinulose, inner linear with inflexed acute (not dilated) tips.*

8. **C. sinensis,** *Gard. et Champ. in Hook. Kew Journ.* 1323 (Cirsium); stem slender strict fastigiately branched above, branches slender erect, leaves narrow sessile linear-oblong or -lanceolate ciliate and spinescent smooth or scaberulous above white-tomentose beneath, heads solitary long-peduncled erect 1 in. diam. glabrous or cottony, outer invol. bracts appressed oblong obtuse or tips spinulose inner linear with inflexed acute tips, corolla ⅝ in. purple. *Clarke Comp. Ind.* 219.

KHASIA MTS.; in marshy places, alt. 4–6000 ft., *Griffith*, &c. DISTRIB. Upper Birma, China.

Stem 3–6 ft., stiff, glabrous or slightly pubescent. *Leaves* numerous, 2–5 in., the larger and longer sinuate-lobed, the lobes bearing 2–3 spines, the sinus spinulose, margins of the smaller leaves recurved, upper very small. *Invol. bracts* very numerous and appressed, imbricate in many series. *Achenes* ⅙ in.; pappus ⅓ in.

88. SILYBUM, *Gærtn.*

An erect glabrous thistle. *Leaves* alternate, sinuate-lobed, spinescent, marbled with white. *Heads* large, solitary, terminal, nodding, homogamous; flowers all ☿, similar and fertile, purple, tube slender, limb dilated below 5-fid. *Involucre* subglobose; bracts ∞-seriate, broad and fimbriated with spines below above terminating in a spreading rigid spine, inner lanceolate erect pungent; receptacle flat, densely bristly, *Filaments* glabrous, united in a sheath below; anther-bases sagittate, auricles connate mucronate or shortly tailed. *Style* subentire, ring below the hairs not prominent. *Achenes* glabrous, obovoid-oblong, compressed, basal areole straight; pappus-hairs ∞-seriate, unequal, subpaleaceous, united at the base in a deciduous ring.

S. Marianum, *Gaertn.*; *Boiss. Fl. Orient.* iii. 556; *DC. Prodr.* vi. 616; *Clarke Comp. Ind.* 220; *Reichb. Ic. Fl. Germ.* t. 151. Carduus Marianus, *Linn.*

PUNJAB and N. W. HIMALAYA; Peshawur, Hazara, and from Kashmir to Jamu, alt. 6–8000 ft.—DISTRIB. Westwards to N. Africa and Europe.

Annual or biennial, shining; stem 1–4 ft., grooved, not winged. *Leaves* large, with strong spines. *Heads* 1–2 in. diam., base intruded; invol. bracts coriaceous, with a spine ½–¾ in. long, outermost mucronate; receptacle fleshy, flowers rose-purple. *Achenes* ¼ in., transversely wrinkled, black or gray; pappus white.

89. **SAUSSUREA,** *DC.*

Annual, biennial or perennial, glabrous or tomentose herbs of various habit. *Leaves* unarmed, alternate, entire toothed pinnatifid or pinnatisect. *Heads* narrow or broad, sometimes crowded on the dilated top of a simple stem, peduncled or sessile, solitary corymbose or panicled, homogamous; flowers purple or blueish, all ☿ and similar, tube slender, limb narrow 5-fid. *Involucre* ovoid oblong globose or hemispheric; bracts ∞-seriate, appressed, not spinescent, inner longer narrower; receptacle flat or convex, densely bristly, rarely naked. *Filaments* free, glabrous; anther-bases sagittate, auricles connate, tails usually long entire ciliate or woolly. *Style-arms* linear. *Achenes* glabrous, oblong, 4-ribbed, smooth or rugose; top truncate and cupular, or crowned with a thickened disk and the persistent base of the style; basal areole straight; pappus-hairs 1–2-seriate, inner feathery, base thickened and connate into a deciduous ring, outer usually of rigid scabrid bristles rarely feathery or 0.—DISTRIB. Species about 60, northern temp. and mountain plant.

Saussurea finds its maximum development in the Himalaya, and is protean in habit, foliage, inflorescence, and all its organs. It presents two very distinct groups, of which that designated *Eriocoryne* is as well deserving of generic recognition as any in the Order. For the subordinate divisions I have been compelled to have recourse to characters of habit and foliage. Little dependence can be placed on the size of the head, nor on the number, form and texture of the invol. bracts (of which *S. deltoides* is a most conspicuous example); nor on the absolute length of the recept. bristles, though their relative length is a fair guide. The achenes often vary extremely in the same species, in length, amount of compression, smoothness or roughness, and in the form of the top; and the outer pappus, which is always, when present, caducous, is sometimes absent or present in the same species.

SUBGEN. I. **Eusaussurea.** Glabrous, woolly or cottony, rarely villous herbs. *Stem* 0 or simple or branched above. *Heads* sessile or peduncled. *Achenes* truncate or crowned with a rim or cup on which the outer pappus, if present, is inserted.

SECT. 1. *Stem* simple, leafy. *Heads* more or less enclosed in the inflated bladdery, membranous, veined uppermost leaves. (See also *S. glandulifera.*)

1. **S. obvallata,** *Wall. Cat.* (*under* 2906); stem stout simple pubescent or glabrate, leaves 4–8 in. glabrous obtuse toothed lower petioled elongate-obovate, cauline sessile ½-amplexicaul oblong concave, floral cymbiform membranous enclosing 2–6 sessile or shortly peduncled glabrous heads, invol. bracts lanceolate, pappus brown, outer bristles scabrid or 0. *Clarke Comp. Ind.* 223. Carduus obvallatus *and* C. tectus, *Wall. Cat.* 2095, 2906. Aplotaxis obvallata, *DC. Prodr.* vi. 541; *Deless. Ic. Sel.* iv. t. 69; *Ledeb. Fl. Ross.* ii. 673 (Haplotaxis).

WESTERN HIMALAYA; from Kashmir to Sikkim, alt. 10–15,000 ft., *Blinkworth*, &c.—DISTRIB. Altai Mts.

Root very thick, crowned with blackened remains of petioles, &c. *Stem* 6–18 in., as thick as a little finger or less, terminated by the incurved bladdery veined translucent leaves which form a pale head 3–6 in. diam. *Heads* ½–¾ in. diam., hemispheric; invol. bracts tipped and often margined with black; corolla ½ in.; anther-tails very

short, laciniate. *Achenes* obovoid, flattened, glabrous, ribbed; pappus ⅓ in., pale brown with sometimes a few outer rough bristles.—There is no specimen of *C. tectus* in Wallich's Herbarium, and I follow DC. in citing it as a synonym.

2. **S. uniflora,** *Wall. Cat.* 2916; stem simple laxly villous, leaves 4–8 in. glabrous obtuse toothed, lower long-petioled linear-oblong or -obovate, cauline sessile ½-amplexicaul often acuminate, floral usually cymbiform membranous often enclosing the large usually solitary subsilky head, peduncle stout silkily woolly, invol. bracts ovate-lanceolate, pappus brown outer bristles scabrid.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich.* Sikkim, alt. 10–15,000 ft., *J. D. H.*, &c.

Stem 1–2 ft., more slender than in *S. obvallata. Radical leaves* with the blade 4–7 in., and the petiole as long; involucriform leaves purple, quite entire, sometimes small and enclosing only the very young head, at others reduced, elliptic, acuminate, silkily villous on both surfaces. *Head* very variable in size, rarely two, 1–2 in. diam., campanulate; invol. bracts with long narrow tips; corolla ½ in. long; anther-tails laciniate. *Achenes* ⅙ in., glabrous; pappus as in *S. obvallata*, but longer, ½ in.

VAR. *conica*; heads many. S. conica, *Clarke Comp. Ind.* 224.—Sikkim, Singalelah, alt. 10,000 ft., *Clarke.* I find no character whatever, except the number of heads, to separate this from *S. uniflora*, which is an unfortunate name.

3. **S. Schultzii,** *Hook. f.*; glabrous or puberulous, stem stout simple, leaves toothed radical narrowed into a very stout petiole linear-oblong acute midrib very thick, cauline ½-amplexicaul acuminate, floral short cymbiform membranous partially enclosing the numerous crowded silkily villous heads, invol. bracts blackish lanceolate acuminate, pappus brown outer bristles scabrid.

WESTERN TIBET; from N. Kashmir to the Karakoram Mts., alt. 14–17,000 ft., *Thomson*, &c.

Root very stout; crown clothed with the stout recurved remains of the old petioles; stem 6–16 in., often coloured. *Leaves* 3–5 by ⅓–1½ in., leathery, coarsely toothed; floral 1–2 in. long, often as broad and rosy. *Heads* ½–1 in. diam.; peduncles short, stout, densely woolly; invol. bracts with very slender tips, corolla ½ in.; anther-tails short woolly. *Achenes* glabrous, ripe not seen; pappus whiter than in *S. obvallata.* The late Prof. Schultz proposed (in mss.) the name of *setifolia* for this, but I cannot see how it applies in any sense. It may be only a large form of the following.

4. **S. bracteata,** *Dcne. in Jacq. Voy. Bot.* 94, t. 102; dwarf, scaberulous or puberulous, stem 3–6 in. very stout, leaves linear-lanceolate or narrowly elliptic acute coarsely toothed, lower narrowed into a very short petiole, upper sessile, floral short cymbiform membranous coloured partly enclosing the solitary large sessile subsilky head, invol. bracts blackish lanceolate acuminate, pappus white, outer bristles scabrid. *Clarke Comp. Ind.* 224. ? S. Schlagintweitii, *Klatt in Sitzung. Münch. Akad.* 1878, 94.

WESTERN TIBET; from Ladak and Nubra eastwards to the Balch Pass (N. of Kumaon), alt. 14–18,000 ft., *Jacquemont*, &c.

This much resembles a diminutive form of *S. Schultzii* with one or two stems from the root, shorter petioles, and much larger heads in proportion, varying from 1–1½ in. diam.; the achenes are similar, and the pappus is white ½ in. long.

SECT. 2. **Acaules.** *Stem* very short or obsolete (or elongate in *S. Sughoo*). *Heads* solitary or few, sessile or subsessile amongst the leaves. (See also sessile-headed forms of species in sect. 3.)

* *Pappus double, hairs of both feathery. Densely tufted dwarf herb, leaves not pinnatifid.*

5. **S. Thomsoni,** *Clarke Comp. Ind.* 227; dwarf, stemless, glabrous,

leaves small ½–1½ in. sessile or narrowed into a short thick petiole obovate or oblong obtuse quite entire or obtusely toothed densely coriaceous nerveless, uppermost orbicular sheathing the involucre, heads one or more sessile crowded subglobose, invol. bracts obovate-oblong obtuse glabrous, receptacle fimbrillate, pappus double both feathery. S. acaulis, *Klatt in Sitzung. Münch. Akad.* 1878, 91.

WESTERN TIBET; Nubra, alt. 17–18,000 ft., *Thomson*; *Schlagintweit.*

Root fusiform, crown very short. *Leaves* variable, always thickly coriaceous, in a flowerless specimen 2½ in. long and narrowly spathulate, in most others spreading obovate, midrib very indistinct. *Heads* ½ in. diam., densely clustered, sheathed by rounded floral leaves which are much shorter than the involucre; invol. bracts purplish; corolla ¼ in. long.; anther-tails short, entire. *Achenes* ⅛ in., glabrous, ripe not seen; pappus ¼ in., brown, all the hairs softly feathery.

6. **S. wernerioides,** *Schultz-Bip. in Herb. Hook.*; dwarf, densely tufted, leaves ¼–½ in. narrowed into densely imbricating sheathing petioles lanceolate coriaceous glabrous above densely tomentose beneath, tip subulate, margins toothed revolute often to the midrib, heads solitary sessile amongst the leaves ¼–½ in. diam., invol. bracts lanceolate acuminate rigid or broad and concave, receptacle bristly, pappus double both feathery. S. subulata, *Clarke Comp. Ind.* 226, *in part.*

SIKKIM HIMALAYA; on the Tibetan frontier, alt. 16–18,000 ft., *J. D. H.*

Root a foot long; crown dividing into numerous densely tufted branches ½–1 in. long, together forming cushions. *Leaves* erect or spreading, very coriaceous, rather glossy above. *Invol. bracts* very variable, often purple, glabrous or sparsely woolly, sometimes lanceolate acuminate, at others apparently replaced by the short concave, coriaceous sheaths of the uppermost leaves; recept. bristles (overlooked in Clarke's description) rigid, scabrous; corolla ¼ in.; anther-tails long, woolly. *Achenes* very small (not ripe).

** *Outer pappus of scabrid bristles or* 0; *leaves entire or pinnatifid.*

7. **S. subulata,** *Clarke Comp. Ind.* 226, *in part*; dwarf, densely tufted, below densely clothed with imbricating sheathing petioles, leaves ½–1½ in. very laxly hairy or glabrate sparsely woolly towards the base linear-lanceolate or subulate narrowed into the sheathing petiole, tip subulate, margin quite entire revolute to the midrib, heads ½–1 in. diam. solitary sessile amongst the leaves, invol. bracts oblong-lanceolate acuminate rigid, receptacle fimbrillate, outer pappus bristles scabrid. S. setifolia, *Klatt in Sitzung. Münch. Akad.* 1878, 95.

WESTERN TIBET; Nubra, alt. 15–18,000 ft., *Thomson.*—DISTRIB. Yarkand.

Habit of *S. wernerioides*, but the leaf bases are woolly, the leaves much narrower, not at all toothed, and less coriaceous, the heads are larger, the receptacle fimbrilliferous, and the few outer pappus bristles are scabrid. It may be a dwarf high alpine form of *S. glandulifera*; the anther-tails are short and bearded.

8. **S. Atkinsoni,** *Clarke Comp. Ind.* 224; stemless, glabrous or midrib and nerves of leaves beneath pubescent, leaves 3–5 petioled or sessile spreading from the root broadly obovate or elliptic membranous toothed reticulate, head sessile solitary, inner invol. bracts linear oblong scarious, receptacle naked or entire, outer pappus bristles few scabrid.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 10–13,000 ft., *Falconer*, &c.

Root-stock undivided. *Leaves* 2½–4 by 1½–3 in., spreading flat on the ground. *Head* ¾–1 in. long; outer invol. bracts very variable, ovate-lanceolate, erect or recurved, glabrous or margins pubescent; corolla upwards of ½ in.; anther-cells shortly fimbriate. *Achenes* glabrous; pappus ½ in., brown.—See remarks under *S. Clarkei* in reference to this species.

9. **S. Stoliczkai,** *Clarke Comp. Ind.* 225; dwarf, densely tufted, white with cottony wool, leaves obovate-oblong or oblanceolate lyrate or sinuate-pinnatifid cottony beneath or on both surfaces, lobes acute or obtuse short very irregular terminal ovate, head $\frac{1}{3}$–1 in. diam. sessile, invol. bracts linear-lanceolate outer with broad bases inner narrower membranous with dark tips, receptacle densely bristly, outer pappus bristles few scabrid.

WESTERN TIBET and KUNAWUR; alt. 13–16,000 ft., *Thomson, Stoliczka.*

Root stout; branches of stock often as thick as the little finger, crown divided into very stout short 1-headed branches clothed with brown scarious leaf-sheaths. *Leaves* 1–2 in., usually snow white, lobes sometimes a little recurved, obtuse or acute. *Invol. bracts* $\frac{2}{3}$ in. long, sheathed by the bases of the uppermost leaves; corolla upwards of $\frac{1}{2}$ in.; anther-tails short woolly. *Achenes* glabrous, $\frac{1}{6}$ in. long; pappus $\frac{1}{2}$ in. brown.

10. **S. Sughoo,** *Clarke Comp. Ind.* 225; dwarf, stem 0 or 4–6 in., leaves oblong-obovate or oblanceolate acute very coriaceous narrowed into the petiole coarsely toothed or runcinately pinnatifid with the teeth and lobes apiculate scaberulous above white-tomentose beneath, heads $\frac{1}{2}$ in. diam. solitary sessile or 2–3 shortly peduncled glabrous or puberulous, outer invol. bracts lanceolate from an ovate base coriaceous inner linear acuminate scarious, receptacle bristly, outer pappus-bristles scabrid or 0.

SIKKIM HIMALAYA; towards the Tibetan frontier, alt. 12–16,000 ft., *J. D. H.*, *T. Anderson.*

Very variable, smaller specimens have a divided root-stock $\frac{1}{2}$–1 in. long and one sessile head, larger have an undivided stock and an elongating leafy stem 6 in. high with 2 or more peduncled heads. *Leaves* coriaceous in the larger specimens, 3 in. long with a slender petiole 1–1$\frac{1}{2}$ in., in smaller the leaves are shorter petioled or subsessile, upper surface reticulated. *Invol. bracts* above margined and tipped with dark purple; corolla more than $\frac{1}{2}$ in.; anther-tails short, woolly. *Achenes* muricate and sparsely villous; pappus $\frac{1}{2}$ in. pale brown.

11. **S. Yakla,** *Clarke Comp. Ind.* 227; dwarf, stemless, leaves sessile or petioled spreading large short or long linear-oblong pinnate or pinnatifid membranous puberulous above white-tomentose beneath, lobes or segments broadly ovate or subtriangular sinuate-toothed tips and teeth mucronate, heads 1–3 very large 1–3 in. diam. sessile pubescent or glabrate, invol. bracts narrowly lanceolate acuminate rather membranous pale, recept. bristles long, anther-tails laciniate, achenes 4-gonous muricate, outer pappus-hairs 0.

SIKKIM HIMALAYA; Yeumtong and Chola, alt. 11–12,000 ft., *J. D. H.* Yakla, alt. 16,000 ft., *Clarke.*

Root-stock woody, undivided. *Leaves* very flaccid in specimens from 11–12,000 ft., 10–15 by 2–2$\frac{1}{2}$ in., in those from 16,000 ft. 3–4 in. by 2–3 in. *Heads* very variable; invol. bracts erect; corolla nearly 1 in. long. *Achenes* $\frac{1}{6}$ in., angled; angles muricate, crown strongly cupped; pappus $\frac{3}{4}$ in., brown.—Habit of a *Dolomiæa* (*Jurinæa*).

SECT. 3. **Caulescentes.** *Heads* solitary, rarely 2–3 on an erect elongate quite simple stem or leafy peduncle 1–6 in. high. *Leaves* both radical and cauline. (Heads sometimes sessile, see also forms of species in sect. 2.)

* *Leaves pinnatifid or pinnate, white beneath.*

12. **S. taraxicifolia,** *Wall. Cat.* 2914; stem 0 or 1–6 in. glabrous or cottony, leaves petioled spreading linear elongate runcinate-pinnatifid glabrous or nearly so above white-tomentose beneath, lobes numerous oblong or obtusely triangular rarely toothed or lobulate, tips and teeth mucronate, head solitary 1–1$\frac{1}{2}$ in. diam. glabrous or sparsely cottony, invol. bracts lanceolate, receptacle

densely bristly, anther-tails short woolly, achenes glabrous, outer pappus-hairs few scabrid. *DC. Prodr.* vi. 532; *Clarke Comp. Ind.* 228. S. cæspitosa, *Wall. Cat.* 2913; *Clarke l. c.* Aplotaxis cæspitosa, *DC. l. c.* 539. Cyathidium taraxicifolium, *Lindl. in Royle Ill.* 251, t. 56, f. 2.

ALPINE HIMALAYA; from Kunawur to Sikkim, alt. 12 15,000 ft. WESTERN TIBET; Rupchu, alt. 16,000 ft., *Heyde.*

Very variable; stock stout, clothed with the black remains of withered petioles, simple or divided; stem rarely 6 in., rather slender. *Heads* very variable in breadth and shape, and the bracts in breadth, outer sometimes with recurved tips; corolla upwards of ½ in. *Pappus* pale brown, ½ in.

VAR. *depressa*; dwarf, stemless, leaves 2–3 in. more regularly and closely pinnatifid with recurved short lobes.—Garwhal to Sikkim, alt. 12–15,000 ft.

13. **S. Kunthiana,** *Clarke Comp. Ind.* 225; dwarf, stemless, leaves petioled spreading linear-elongate pinnatifid or runcinate glabrous or pubescent above white-tomentose beneath, lobes quadrate semi-circular or oblong entire or lobulate and toothed, tip teeth and lobes apiculate or mucronate, head solitary sessile 1–1½ in. diam., invol. bracts lanceolate inner often with subsquarrose tips, anther-tails short woolly, receptacle bristly, achenes muricate, outer pappus-hairs few scabrid. Leontodon ? Kunthianum, *Wall. Cat.* 3292. Aplotaxis leontodontoides, *DC. Prodr.* vi. 539.

ALPINE HIMALAYA; from Kashmir to Sikkim, and WESTERN TIBET, alt. 14–16,000 ft.

Very similar indeed to var. *depressa* of *S. taraxicifolia*, from which the muricate achenes at once distinguish it, the lobes of the leaf are $\frac{1}{4}$–$\frac{1}{3}$ in. long, usually broader, more square and lobulate, and their upper surface is never glabrous.

VAR. *major*; larger in all its parts, leaves sometimes pinnatisect, lobes $\frac{1}{3}$–$\frac{1}{2}$ in. less recurved broadly oblong or ovate sinuate or subpinnatifid scabrid above, invol. bracts glabrous more coriaceous, anther tails more conspicuously woolly.—Sikkim, interior ranges, alt. 13–16,000 ft.

VAR. *filicifolia*; leaves pinnatifid nearly to the midrib, lobes regular oblong or linear-oblong entire or auricled at the base of the upper margin obtuse or apiculate. —Sikkim, Jongri and Yakla, alt. 13,000 ft., *Clarke.* Habit of a small *Polypodium.*

14. **S. polystichoides,** *Hook. f*; dwarf, stemless, leaves petioled spreading linear-elongate pinnatisect glabrous above white-tomentose beneath, segments rounded ovate or subquadrate spinulous-toothed, heads ½–1 in. sessile or peduncled glabrous, invol. bracts lanceolate acuminate erect or subsquarrosely recurved, anther-tails short woolly, receptacle naked, achenes muricate, outer pappus-hairs few scabrid.

SIKKIM HIMALAYA; alt. 13–16,000 ft., *J. D. H., Elwes, Clarke.*

Very closely allied indeed to *S. Kunthiana*, but the leaves are pinnate and the receptacle without bristles; the leaf segments are horizontal and slightly recurved.

15. **S. Falconeri,** *Hook. f.*; stem very stout short or long cottony or woolly, leaves petioled linear-elongate cottony above and more so beneath irregularly sinuate-pinnatifid or toothed, lobes or teeth distant spreading or recurved broadly triangular acute, heads 1–2 in. diam., invol. bracts linear-lanceolate cottony, recept. bristles shorter than the smooth achenes, anther-tails short woolly, pappus double or single.

WESTERN TIBET; Karakoram, alt. 14,500 ft., *Falconer, Clarke.* KASHMIR, alt. 13,000 ft. *Clarke.*

Very similar to *S. taraxicifolia*, but distinguished by the woolly habit and very stout stem or peduncle. *Stock* stout or slender, sometimes very thickly clothed with the black shining remains of the old petioles. *Stem* 1–6 in., nearly ¼ in. diam., sparingly leafy. *Leaves* 3–6 by ¼–½ in. *Invol. bracts* pale, erect, corolla 1¼ in.

Pappus more than ½ in., pale brown.—I can find no difference whatever between the two following forms except that of the pappus.

VAR. 1. Outer pappus of plumose bristles.—Kashmir.

VAR. 2. Outer pappus of scabrid bristles or 0.—Western Tibet and Kashmir.

** *Leaves pinnatifid, glabrous on both surfaces.*

16. **S. Andersoni,** *Clarke Comp. Ind.* 226; perfectly glabrous, stem 0 or 3–6 in., leaves spreading linear-elongate sessile or petioled membranous pale beneath runcinate-pinnatifid, lobes distant small short ovate and acute or subulate, heads solitary ½–1 in., invol.-bracts ovate or ovate-lanceolate with dark borders, recept. bristles few, anther-tails woolly, achenes muricate, pappus dark brown outer 0.

SIKKIM HIMALAYA; Lachen, alt. 10–12,000 ft., *J. D. H.*; Jongri, alt. 13,000 ft., *Clarke.*

This much resembles *S. taraxicifolia*, but is perfectly glabrous, with very short distant leaf-lobes or -teeth, between which the rachis is linear, the invol. bracts are much broader and highly coloured, the achenes and pappus are very different.

17. **S. eriostemon,** *Wall. Cat.* 2912; nearly glabrous, stem stout elongate 6–12 in. 1-leaved, leaves membranous almost all radical linear pinnatifidly lobed and toothed, lobes and teeth short broad acute and aristate, head solitary 1–1½ in. diam., invol. bracts lanceolate subsquarrose, recept. bristles long, anther-tails fimbriate, achenes smooth 4-angled, outer pappus 0. *Clarke Comp. Ind.* 229. Aplotaxis nepalensis, *Spreng. Syst. Veg.* iii. 380; *Deless. Ic. Sel.* iv. t. 67; *DC. Prodr.* vi. 529. Centaurea taraxicifolia, *Don Prodr.* 167; *Less. in. Linnæa*, vi. 88. Eriostemon taraxicifolium, *Less. Synops.* 12.

NIPAL, *Wallich.*

The foliage of this resembles strongly that of *S. Andersoni*, but the achenes are very different.

*** *Leaves entire or nearly so, tomentose villous or woolly beneath, or on both surfaces, glandular-pubescent in* S. glanduligera.

18. **S. Roylei,** *Clarke Comp. Ind.* 229, *excl. syn.*; stem stout 6–18 in. glabrate or cottony, radical leaves 3–10 in. petioled erect elongate-lanceolate acuminate quite entire or sinuate or pinnatifid towards the base only, cauline few sessile ½-amplexicaul, heads large 1½–2 in. usually bracteate tomentose, invol. bracts lanceolate, recept. bristles equalling the long smooth achenes, anther-tails woolly, outer pappus bristles scabrid. S. uniflora, *Clarke l. c.* 229, *not of Wallich.* Aplotaxis Roylei, *DC. Prodr.* vi. 539.

WESTERN HIMALAYA; from Kashmir to Kunawur, alt. 11–14,000 ft., *Falconer*, &c.

Root-stock stout, usually simple, clothed with the remains of broad petiolar sheaths. *Stem* usually very stout and thickened under the head. *Leaves* very variable in length and breadth, much narrowed at both ends, sometimes runcinate or lyrate-pinnatifid, sometimes snow-white beneath, nearly glabrous in a specimen from Munro, nearly 2 in. broad in some of Thomson's from the Werang Pass. *Invol. bracts* long, straight; corolla short for the size of the head, about ½ in. long. *Achenes* ¼ in. and upwards, narrow, angled and delicately ribbed; pappus ⅓ in., pale brown, outer bristles numerous, sometimes unilateral.

19. **S. graminifolia,** *Wall. Cat.* 2911; stem 6–10 in. very stout much thickened upwards leafy densely silkily woolly and shining, rarely glabrate, leaves very slender narrowly linear from a dilated shining scarious base flexuous tomentose beneath, margins quite entire recurved, head solitary 1–1½ in. diam. densely silkily woolly bracteate by many spreading or reflexed or linear leaves,

invol. bracts narrow lanceolate, recept. bristles short, achenes (unripe) short smooth, outer pappus bristles many short scabrid.

Western Himalaya; Kumaon, *Blinkworth*, alt. 12,000 ft., *Edgeworth*. Western Tibet; Salt Marshes, Ladak and below the Ladak Pass, alt. 15–16,000 ft., *Thomson*. Barji Kang, alt. 13,500 ft., *Strach. & Winterb.*

Root long, stout; crown divided. *Leaves* 2–5 by $\frac{1}{10}$–$\frac{1}{6}$ in.; sheathing petioles membranous, 1 in., glabrous except at the margins, contrasting with the silky wool of the stem, which is $\frac{1}{3}$ in. thick round the base of the head. *Invol. bracts* membranous; corolla not $\frac{1}{2}$ in. long; anther-tails fimbriate. *Achenes* (unripe) small, $\frac{1}{10}$ in. long; pappus pale brown.—A very distinct species.

Var. *glabrata*; sparsely woolly, more slender, leaves more erect, invol. bracts shorter and straighter not hidden below in silky wool, achenes longer pale shining 4-angled.—Western Tibet. Though differing so much in the involucre and in woolliness from the type, I can hardly doubt this being a form of *S. graminifolia*.

20. **S. Hookeri,** *Clarke Comp. Ind.* 230; stem 4–6 in. stout much thickened (and hollow) upwards silkily woolly, leaves slender narrowly linear from a dilated scarious base curved tomentose beneath margins quite entire recurved, head solitary 1–1$\frac{1}{2}$ in. bracteate by broad obtuse short appressed leaves, invol. bracts broadly lanceolate or ovate, recept. bristles long dense, achenes short, outer pappus bristles short scabrid.

Alpine Himalaya; Tibetan frontier of Kumaon, Balch Pass, alt. 16,000 ft., *Strach. & Winterb.*; and of Sikkim, alt. 17,000 ft., *J. D. H.*, *Elwes*.

Rootstock stout, simple or divided, clothed with black scarious dried petiolar sheaths; stem shorter stouter and more leafy than in *S. graminifolia*; leaves rather broader, more coriaceous, floral usually short and broad, but very variable; corolla nearly $\frac{1}{2}$ in.; achenes unripe very small, pappus very pale $\frac{1}{3}$ in.

21. **S. hieracioides,** *Hook. f.*; softly villous, stem 4–8 in. slender, radical leaves petioled elliptic acute villous on both surfaces quite entire or obscurely toothed nerves spreading, cauline few linear-oblong, heads 1–1$\frac{1}{2}$ in. diam. solitary woolly at the base, invol. bracts ovate-lanceolate erect coloured, recept. bristles short, achenes very short smooth, outer pappus bristles scabrid.

Sikkim Himalaya; Tungu, near the Tibetan frontier, alt. 12–14,000 ft., *J. D. H.*

Habit of *Hieracium alpinum*, uniformly villous with soft spreading hairs. *Stock* short, stout, simple, clothed with scarious dark petiolar remains. *Leaves* few, radical 1$\frac{1}{2}$–2$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{4}$ in., green; petiole variable, slender. *Invol.* bracts wholly or margined with purple, inner glabrous; corolla 1$\frac{1}{4}$ in.; anther-tails short, very woolly. *Achenes* (unripe) $\frac{1}{10}$ in., very broad; pappus $\frac{1}{2}$ in. pale.

22. **S. glanduligera,** *Schultz-Bip. in Herb. Hook.*; stem 4–8 in. and leaves on both surfaces glandular-pubescent or -puberulous, leaves narrowly linear-lanceolate irregularly sinuate toothed, petiole dilated into a narrow glabrous sheath with often woolly base and margins, cauline subsimilar, heads solitary 1–1$\frac{1}{2}$ in. usually bracteate by linear leaves, invol. bracts lanceolate green erect pubescent or woolly, recept. bristles long, achenes 4-angled scaberulous, outer pappus bristles short scabrid.

Western Tibet; Ladak, alt. 14–16,000 ft., *Thomson*, *Heyde*; Lahoul, *Hay*.

Root very stout; stock branched. *Leaves* 2–4 in. (larger in var. *major*), pale green; petiolar sheaths of radical, very conspicuous pale chestnut brown, ribbed, with soft white silky wool at the bases of the younger. *Invol. bracts* pale, not numerous; corolla nearly $\frac{1}{2}$ in.; anther-tails short woolly. *Achenes* $\frac{1}{8}$ in. long, pale, much cupped at the top; pappus-hairs $\frac{1}{2}$ in., pale brown or blueish.

Var. *major*; taller, leaves large and broader 8–10 by $\frac{3}{4}$–2 in. puberulous only, heads 1–3, corolla $\frac{5}{8}$ in.—Piti, alt. 14–17,000, *Thomson*. Tibet north of Kumaon, alt. 16,000 ft., *Strach. & Winterb.* This approaches *S. bracteata*.

SECT. IV. **Corymbiferæ.** Stem 1–3 ft., simple, leafy. *Leaves* not pinnatifid or lobed, radical 0, cauline large sessile or petioled. *Heads* rather small, $\frac{1}{3}$–$\frac{2}{3}$ in., in terminal dense corymbs; receptacle small. *Achenes* smooth, angled; outer pappus bristles few or many, scabrid.

23. **S. Candolleana,** *Wall. Cat.* 3289; stem 1–3 ft. more or less winged by the decurrent petioles or leaf bases, leaves oblong or ovate-lanceolate acute or acuminate denticulate glabrous above cobwebby or cottony beneath, base rounded or abruptly or gradually narrowed decurrent, heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam. or in dense terminal corymbs, invol. bracts ovate obtuse or acute glabrous or silky, receptacle small bristles longer than the narrow smooth 4–5-angled achenes, outer pappus bristles short scabrid. S. pterocaulon, *Dcne. in Jacq. Voy. Bot.* 95, *t.* 103. Aplotaxis Candolleana, *DC. Prodr.* vi. 541. Jurinea adenocarpa, *Ledeb. Fl. Ross.* ii. 765; *Schrenk. Enum. Pl. Nov.* i. 46.

TEMPERATE HIMALAYA; from Kashmir, alt. 8–10,000 ft., *Falconer*, &c., to Sikkim, alt. 11–13,000 ft., *J. D. H.*—DISTRIB. Soongaria.

Stem stout, deeply grooved. *Leaves* 3–6 by 1–3$\frac{1}{2}$ in., oblong and sessile but nerveless, abruptly narrowed below the middle, membranous, rarely quite glabrous beneath. *Heads* shortly peduncled; corolla $\frac{1}{4}$–$\frac{1}{3}$ in.; anther-tails fimbriate. *Achenes* $\frac{1}{5}$ in., long, narrow, shining; pappus $\frac{1}{3}$ in. long, pale brown.

24. **S. piptathera,** *Edgew. in Trans. Linn. Soc.* xx. 76; stem 1–3 ft. not winged, leaves oblong or ovate-oblong with a contracted or dilated $\frac{1}{2}$-amplexicaul auricled base sharply toothed glabrous above cottony rarely glabrate beneath, heads $\frac{1}{2}$ in. in a crowded dense corymb, invol. bracts glabrate or silky outer ovate obtuse, inner lanceolate acute, recept. bristles longer than the achenes, outer pappus bristles short scabrid. Aplotaxis discolor, *DC. Prodr.* vi. 541.

WESTERN HIMALAYA; from Chumba to Kumaon, alt. 9–12,000 ft., *Royle*, &c.

Very similar to *S. Candolleana* in the head, flowers, achenes, &c., but at once distinguished by the stem not being winged, and by the leaf-base. Specimens from Herb. Falconer (without locality) have the leaves quite glabrous on both surfaces.

25. **S. Clarkei,** *Hook. f.*; stem 4–6 in. stout pubescent, leaves 4–5 in. obovate acute sessile or contracted into a winged petiole sharply toothed membranous puberulous above cottony or glabrate beneath, heads $\frac{1}{3}$ in. diam. in a dense terminal cluster, invol. bracts glabrous or cottony outer ovate acute inner lanceolate acuminate, recept. bristles longer than the achenes. S. Candolleana, *Clarke Comp. Ind.* 230, *not of Wallich.*

KASHMIR, *Falconer*; Tilail, alt, 13–14,000 ft., *Clarke.*

This is in habit intermediate between *S. pterocaulon* and *S. Atkinsoni*, agreeing with the former in the heads, flowers, &c., but differing in the small size, peculiar habit and leaf-base; and from the latter (which it resembles in the foliage) in the stout stem, small crowded heads, and recept. bristles. *Pappus* brown.

26. **S. elliptica,** *Clarke mss.*; stem 4–6 in. slender cottony, leaves 3–4 in. long-petioled elliptic-oblong or -lanceolate acute irregularly toothed thinly cottony on both surfaces, heads $\frac{1}{3}$ in. diam. in a small rather lax terminal corymb, invol. bracts lanceolate acuminate subsilkily villous, receptacle naked, outer pappus bristles numerous scabrid.

WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke.*

I have seen only three specimens of this very distinct species. Grey-green when dry; stem ascending from a slender simple or divided stock, curved. *Leaves* flaccid, narrowed into a very slender cottony petiole. *Corolla* nearly $\frac{1}{2}$ in.; anther-tails laciniate, hardly woolly. *Achenes* immature; pappus white, except towards the base. —Closely allied to *S. ovata*, Benth. (in "Henderson's Yarkand," p. 325), from Eastern Turkistan, but differing in the form of the leaves.

SECT. V. **Elatæ.** Stems tall, leafy, simple below, corymbosely branched above. *Leaves* all cauline or radical and cauline. *Heads* erect or suberect numerous in branched corymbs all peduncled; invol. bracts rigid, anther-tails fimbriate or subentire. *Pappus* very slender, outer bristles 0.

* *Leaves lyrate-pinnatifid, cottony beneath; heads broad erect or suberect.*

27. **S. affinis,** *Spreng. mss. in DC. Prodr.* vi. 540; stem 2–8 ft. simple below and inflorescence glabrous, leaves lyrate-pinnatifid cottony beneath radical petioled cauline sessile uppermost sinuate-lobed or entire, heads long-peduncled in large open panicled corymbs, invol. bracts glabrate outer ovate obtuse or acute inner lanceolate acuminate, recept. bristles long, achenes smooth 10-ribbed, outer pappus 0. *Clarke Comp. Ind.* 232. Aplotaxis multicaulis, *DC. in Deless. Ic. Sel.* iv. t. 68; *Prodr.* vi. 540. A. carthamoides, *Ham. in DC. l. c.* A. Bungei, *DC. l. c.* 539. Hemistepha lyrata, *Bunge in Fisch. et Mey. Ind. Sem.* ii. 1835, 38. Serratula multicaulis, *Wall. Cat.* 2897. S. carthamoides, *Roxb. Hort. Beng.* 60; *Fl. Ind.* iii. 407. Cnicus carthamoides, *Wall. Cat.* 2896. Cirsium lyratum, *Bunge Enum. Pl. Chin.* 36.

BENGAL; from Silhet to the foot of the Nipal Hills. BURMA; Saluen River, *Wallich.*—DISTRIB. China, Japan.

Annual, stem sometimes as thick as the little finger, and peduncles grooved. *Leaves*, radical 4–8 in., membranous, glabrous or puberulous above. *Heads* 1 in. diam. or less; invol. bracts pale, rarely a little cottony; corolla $\frac{1}{3}$ in. long, very slender, pale red; anther-tails short, fimbriate. *Achenes* $\frac{1}{12}$ in., obovoid, tip contracted; pappus hairs $\frac{1}{3}$ in., very slender, white.

28. **S. candicans,** *Clarke Comp. Ind.* 232; stem 2–5 ft. simple below and inflorescence cottony, leaves oblong or obovate-oblong entire or sinuate-toothed or lobulate at the base or lyrate-pinnatifid glabrous or pubescent above cottony or white tomentose rarely glabrous beneath, heads long-peduncled in large open panicled corymbs, invol. bracts cottony or pubescent lanceolate acuminate, recept. bristles long, achenes 5-angled muricate, outer pappus 0. S. brahuica, *Boiss. Fl. Orient.* iii. 566. Aplotaxis candicans, *DC. Prodr.* vi. 540. A. scaposa, *Edgew. in Trans. Linn. Soc.* xx. 76. Cnicus candicans, *Wall. Cat.* 2893 A. C. D. Cirsium heteromallum, *Spreng. Syst.* iii. 372. Carduus heteromallus, *Don Prodr.* 166, *excl. syn. Roxb.*

SUBTROPICAL and TEMPERATE WESTERN INDIA and the HIMALAYA; from the Salt Range, Hazara and Kashmir to Bhotan, alt. 2–7000 ft.—DISTRIB. Affghanistan.

A more robust plant than *S. affinis*, with less divided leaves, larger heads, and very different achenes. *Leaves* sometimes 18 by 5 in. *Heads* 1–1½ in. diam.; corolla upwards of $\frac{1}{2}$ in. long; anther-tails lacerate. *Achenes* $\frac{1}{8}$ in., top cupular, very variable as to rugosity; pappus-hairs very slender, white, equalling the corolla.—Small specimens are *scapose* and even 1-headed.

29. **S. foliosa,** *Edgew. in Trans. Linn. Soc.* xx. 77 (Aplotaxis); stem 1–2 ft. copiously branched leafy and inflorescence pubescent, leaves 3–4 in. lyrate-pinnatifid puberulous above cottony beneath lobes rounded, heads small $\frac{1}{2}$ in. on slender long axillary and terminal peduncles, invol. bracts very slender with acicular points, recept. bristles long, achenes obtusely 4-angled smooth or somewhat tubercled, outer pappus 0.

WESTERN HIMALAYA; Garwhal and Kumaon, alt. 7–8000 ft., *Edgeworth, Strach. & Winterb.*

Referred by Clarke to *S. candicans*, but I think quite distinct in habit, and especially in the small heads with almost subulate bracts, the very small corollas, and short pappus, neither of which exceed $\frac{1}{4}$ in.

** *Leaves entire or subpinnatifid, cottony or tomentose beneath; heads narrow, erect.*

30. **S. albescens,** *Hook. f. & T. in Clarke Comp. Ind.* 233; stem 6–10 ft. simple below and leaves beneath densely or laxly cottony or tomentose, leaves 4–12 in. acute or acuminate entire or sinuate-lobed or subpinnatifid glabrous scabrid or cobwebby above with slender branching nerves, lower narrowly oblong petioled, upper sessile ovate or linear or oblong-ovate, heads narrow ½–⅝ in. long in copious long peduncled terminal and axillary flat-topped corymbs, invol. bracts erect glabrous rarely cottony rigid purplish outer ovate acute, inner lanceolate, recept. bristles long, achenes narrow 4-angled muricate above, outer pappus 0. ? S. chenopodifolia, *Klatt in Sitzungsb. Münch. Akad.* 1878, 92. Serratula albescens, *Wall. Cat.* 2918. Aplotaxis albescens, *DC. Prodr.* vi. 540.

WESTERN and CENTRAL HIMALAYA; from Murree to Nipal, alt. 6–10,000 ft.

Stem strict, erect, slender for the height of the plant. *Leaves* very variable in length and breadth, tip and teeth apiculate. *Heads* peduncled, erect; receptacle very narrow, bristles longer than the achenes; corolla ⅓ in.; anther-cells fimbriate. *Achenes* ⅐–⅕ in. long, top much cupped; pappus white, ⅕–½ in.

VAR. *brachycephala*; leaves very scabrid above, heads ⅓ in. long fewer on shorter branches more rounded at the base, invol. bracts shorter inner more ovate, corolla and pappus-hairs ⅓ in. —Kashmir, *Stewart*; Mozufferabad, at the foot of the Kashmir hills, *Falconer*. The few short broad flat heads of this look different from those of *S. albescens*, but there are many intermediate forms. I have seen no achenes.

*** *Leaves lyrate-pinnatifid, cottony or tomentose beneath; heads inclined nodding; recept. bristles very long.*

31. **S. hypoleuca,** *Spreng. mss. in DC. Prodr.* vi. 541; stem simple or branched above leafy, leaves lyrate or lyrate-pinnatifid sinuate-toothed glabrous above cottony or white beneath membranous terminal lobe large deltoid acute lateral generally one pair triangular acute, heads 1½–2 in. diam. globose nodding, invol. very broad and open bracts lanceolate acuminate ciliate, recept. bristles exceeding the clavellate pappus, achenes short 4-angled tubercled, pappus single. *Clarke Comp. Ind.* 234. Carduus auriculatus, *Wall. Cat.* 2899. Aplotaxis auriculata, *DC. l. c.*

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–13,000.

Stem rather slender, 2–5 ft., glabrous or puberulous. *Leaves* 3–8 in., variable in breadth, petioled or sessile, petiole auricled at the base or not, terminal lobe sometimes 5 in. diam. *Heads* long-peduncled, inclined or nodding, very many-fld., base often intruded; invol. bracts often recurved; corolla ⅓ in., limb as long as the tube; anther-tails long, subulate, quite entire or split near the tip. *Achenes* ⅙ in. long, almost cubical, with obtuse angles, black, strongly tubercled, tip contracted with a terminal toothed cup; pappus ⅓ in. brown.—This and the following are quite unlike any other Indian species, and are the only ones with decidedly nodding heads.

32. **S. deltoidea,** *Clarke Comp. Ind.* 235, *var. a and β*; stem tall simple below branched above, leaves petioled membranous sinuate-toothed above glabrous or scaberulous beneath white-tomentose or cottony, lower lyrate-pinnatifid terminal lobe very large deltoid lateral variable, upper triangular ovate or deltoid, heads ½–1½ in. very broad nodding panicled or racemose on the branches of a terminal leafy panicle, invol. bracts hoary short ovate obtuse or long and lanceolate tips and margins purple, recept. bristles shorter than the pappus, achenes short 4–5-angled smooth tubercled or scaly, pappus single. *Kurz in Journ. As. Soc.* 1877, ii. 204. Aplotaxis deltoides, *DC. Prodr.* vi. 541.

CENTRAL and EASTERN HIMALAYA; from Garwhal to Bhotan, alt. 6–11,500 ft. MARTABAN, or the Nattoung hills, *F. Mason*.

Stem 4–8 ft., sometimes as thick as the thumb below, grooved, glabrous pubescent or cottony. *Leaves* 2–18 in. long, white or buff beneath, terminal lobe sometimes 10 in. broad. *Heads* extremely variable, sessile or peduncled, scattered or fascicled; invol. bracts glabrous or cottony, all narrow or the outer broad and obtuse, erect or recurved, often tipped and margined with purple; corolla $\frac{1}{2}$–$\frac{2}{3}$ in., tube rather longer than the limb; anther-tails subulate, nearly entire. *Achenes* $\frac{1}{8}$–$\frac{1}{6}$ in., very variable in breadth, always 4–5, 4-angled with a terminal entire or toothed cup, black, perfectly smooth or tubercled on the angles or all over, or covered with broad adnate scales; pappus equalling the corolla, white.

VAR. *nivea*; heads smaller subglobose clustered subsessile or shortly peduncled, invol. bracts shortly ovate obtuse hoary, corolla and pappus $\frac{1}{4}$ in., achenes variable as in the type. S. deltoidea, *var.* polycephala, *Clarke Comp. Ind.* 236. Aplotaxis nivea, *DC. Prodr.* vi. 541. Cnicus niveus, *Wall. Cat.* 2898. Synanthera, *Wall. Cat.* 7135.—Nipal, Sikkim, and the Khasia mts., alt. 4–6000 ft.; Martaban, alt. 6–7000 ft., *Kurz.*—It is difficult to believe that this is a variety of *S. deltoidea*, but the intermediate forms are too numerous to render it doubtful. No other Indian species is so variable in the involucre and achenes.

? VAR. *peguensis*; leaves pubescent or cobwebby above, heads shortly pedicelled subracemose, invol. bracts linear-lanceolate acute erect outer woolly inner villous, achenes oblong cylindric striate smooth. S. peguensis, *Clarke Comp. Ind.* 235.—Karen hills, Birma, *Riley*.—I know nothing of this plant, which Clarke says is perhaps a variety of the Khasian form (var. *nivea*) of *S. deltoidea*. If the description of the achenes is correct, it must be different, for in all the varieties in *S. deltoidea* the 4–5-angled shape of the achene is constant.

33. **S. Jacea,** *Clarke Comp. Ind.* 223; stem 1–4 ft. simple below branched above, leaves uniform, sessile $\frac{1}{2}$-amplexicaul ovate or oblong obtuse or acute quite entire scaberulous on both surfaces, heads $\frac{1}{2}$–$\frac{2}{3}$ in. diam. solitary and terminating the branches or in terminal corymbs, invol. bracts few rigid broad outer ovate obtuse or acute inner lanceolate, receptacle narrow bristles flattened exceeding the involucre, achenes unripe narrow smooth, pappus double hairs all feathery. Aplotaxis Jacea, *Klotzsch in Reise Pr. Wald. Bot.* 79, t. 79.

KASHMIR, KUNAWUR, and WESTERN TIBET, alt. 9–15,000 ft., *Falconer, Thomson.*

Stem rigid, puberulous, terete, not grooved, and branches very leafy. *Leaves* 3–4 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., rigid, base usually rounded. *Heads* on strict rather slender peduncles, invol. bracts appressed, hard, margins purple; receptacle very narrow; bristles curved, gradually narrowed from the flattened base, rigid; corolla $\frac{2}{3}$ in.; anther-tails subulate, entire. *Achenes* (unripe) $\frac{1}{4}$ in. long, smooth, shining, ribs slender, top truncate; pappus more than $\frac{1}{2}$ in., brown.

34. **S. denticulata,** *Wall. Cat.* 2917; stem simple below erect stout leafy, leaves uniform sessile oblong or oblong-lanceolate acute or acuminate finely toothed cottony or glabrous beneath, heads broad solitary and terminal or terminating branches on long peduncles, invol. bracts glabrous rigid obtuse outer ovate inner linear-oblong margins scarious lacerate purple, receptacular bristles flattened exceeding the involucre, achenes compressed smooth many-ribbed, pappus double, hairs all feathery. *Clarke Comp. Ind.* 234. Aplotaxis denticulata, *DC. Prodr.* vi. 539. A. fastuosa, *Dcne in Jacquem. Voy. Bot.* 97, t. 105.

CENTRAL and EASTERN HIMALAYA; from Garwhal to Sikkim, alt. 7–11,000 ft.

Stem 1–3 ft., glabrous or cottony, simple and 1-headed or branched above, each branch with a head. *Leaves* 3–9 by 1–$2\frac{1}{2}$ in., thinly coriaceous, nerves very numerous and slender. *Heads* usually subtended by a small leaf; peduncle sometimes 6 in., very stout and stiff; receptacle broader than in *S. Jacea*; bristles similar; corolla $\frac{1}{2}$ in.; anther-tails short, subulate, perfectly entire. *Achenes* $\frac{1}{5}$ in., narrowly obovoid, strongly many-ribbed, pale, shining, tip oblique rather contracted; pappus $\frac{1}{2}$ in., pale brown.—The inner invol. bracts are almost appendaged by the broad scarious margins; the quite entire short anther-tails are peculiar.

SECT. VI. **Lappa.** Tall, very stout herbs; stem 4–10 ft., simple below. *Heads* corymbose or fascicled or solitary and terminal or axillary; outer invol. bracts broad, rigid; recept. bristles very long, sometimes exceeding the involucre. *Pappus* double, outer hairs feathery.

35. **S. Lappa,** *Clarke Comp. Ind.* 233; stem tall very robust simple pubescent above, leaves membranous scaberulous above glabrate beneath irregularly toothed, radical very large triangular with a long lobately-winged petiole, cauline shorter petioled or sessile with an auricled ½-amplexicaul base, heads subglobose 1–1½ in. diam. sessile axillary or in a terminal cluster of 2–5, invol. bracts very many ovate-lanceolate acuminate rigid squarrosely recurved glabrous, recept. bristles very long, achenes compressed tip narrowed, pappus double hairs all feathery. Aplotaxis Lappa, *Dcne in Jacq. Voy. Bot.* 96, t. 104. Aucklandia Costus, *Falconer in Trans. Linn. Soc.* xix. 23.

KASHMIR, alt. 8–12,000 ft., *Falconer*, &c.

Stem 6–7 ft., as thick as the little finger below. *Radical leaves* with the petiole 2–3 ft. long, terminal lobe often a foot in diameter; cauline 6–12 in. long with the petiole. *Heads* very hard; invol. bracts numerous, purple, young pubescent; recept. bristles ⅔ in.; corolla dark purple, ¾ in. long; anther-tails fimbriate. *Achenes* upwards of ⅓ in., curved, compressed, with thickened margins and one rib on each face, top contracted and cupped; pappus hairs ⅔ in., brown.– Supposed to be the *Costus* of the ancients, and used largely as a medicine in India, but its properties have never been investigated.

SUBGEN. II. **Eriocoryne.** Densely woolly herbs. *Stems* simple, clavate. *Heads* very numerous, sessile and densely crowded on the flat usually hollow dilated top of the stem, often concealed by woolly floral leaves. *Achenes* crowned by the hardened disk and base of the style.

36. **S. gossypiphora,** *Don Prodr.* 168; densely clothed with long white or yellowish matted wool, stem 6–12 in. simple clavate leafy, leaves sessile linear remotely toothed or runcinate-pinnatifid usually glabrous above glabrous or woolly beneath, heads concealed, invol. bracts linear-oblong shining, achenes ⅙ in. narrow 4–5-angled and compressed, outer pappus hairs few scabrid numerous or 0. *Wall. Cat.* 2920 A. S. gossypina, *Wall. Pl. As. Rar.* ii. 32, t. 138; *Clarke Comp. Ind.* 228 (*excl. syn.*). Aplotaxis gossypina, *DC. Prodr.* vi. 541. Eriocoryne nidularis, *Wall. mss.*

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 14–17,000 ft.

Root perennial (or biennial?), spongy, fusiform, simple or forked. *Stem* hollow throughout, often 4 in. broad at the truncate top, base clothed with membranous black shining remains of leaf-bases, leafy throughout and covered often 1 in. thick with wool. *Leaves* 1–6 by ¼–⅓ in., sometimes 2-pinnatifid; lobes or teeth distant. *Heads* very many, ½–1 in. long, cylindric; invol. bracts short, erect, pubescent or woolly above or glabrous and shining throughout; receptacle pitted, bristles about equalling the achenes; corolla ⅓–½ in., straight, limb equalling the tube, lobes short; anthers half included, tails slender, nearly entire. *Achenes* ⅙ in. long, narrowly obovoid, compressed, brown, crowned with a tumid hardened disk and beaked by the style-base.– One of the most singular Himalayan plants, with the habit of *Crepis glomerata*. Wallich (in Plant. Asiat.) changed Don's clumsy name for the more euphonious *gossypina*, but having adopted the former in his catalogue, I feel obliged to retain it.

37. **S. sacra,** *Edgew. in Trans. Linn. Soc.* xx. 76; densely woolly, stem 4–6 in. simple clavate, leaves sessile linear pinnatifid, heads exposed, invol. bracts lanceolate, achenes $\frac{1}{10}$–⅛ in. 4–5-angled smooth or warted, outer pappus hairs scabrid few numerous or 0. S. gossypiphora, *Wall. Cat.* 2910 B.

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 14–18,000 ft.

I greatly doubt this being specifically distinct from *G. gossypiphora*, with which

Wallich (doubtfully) and Clarke have united it; it is, however, a much smaller plant, with exposed heads, narrower involucre bracts, inner pappus hairs united higher up and only $\frac{1}{4}$ in. long; and the small achenes are more obconic, $\frac{1}{10}$ in. long, and often warted or wrinkled. The wool is pink in Sikkim specimens.

38. **S. tridactyla,** *Schultz-Bip. in Herb. Hook.*; densely clothed with matted wool, stem 3-6 in. simple clavate leafy, leaves linear or linear-obovate or spathulate obtuse entire or obtusely 3-6-lobed at the apex densely woolly on both surfaces, heads partially exposed, invol. bracts linear-oblong acute shining, achenes narrow 5-angled, outer pappus 0 or of a very few scabrid bristles.

SIKKIM HIMALAYA; on the Tibetan frontier, alt. 16–18,000 ft., *J. D. H.*

A much more woody-rooted plant than *S. gossypiphora*, with a woody stock, more densely leafy, and the leaves, which are covered with the same long matted wool as the stem, are quite entire or lobulate only towards the apex. The heads and flowers resemble closely those of *S. gossypiphora*, but the pappus, which is pale brown, is almost invariably single.

39. **S. sorocephala,** *Hook. f. & T. in Clarke Comp. Ind.* 226; dwarf, densely tufted, stem 0 or very short thickly woolly or cottony, leaves $\frac{1}{2}$–1 in. obovate-lanceolate or oblong-obovate subacute entire or obscurely toothed, heads exposed, invol. bracts lanceolate silky, achenes narrow 5-angled, outer pappus hairs scabrid many few or 0. Aplotaxis gnaphalodes, *Royle Ill.* 259, t. 59; *DC. Prodr.* vi. 542. A. andryaloides, *DC. l. c.* Haplotaxis sorocephala, *Schrenk Enum. Pl. Nov.* i. 43; *Ledeb. Fl. Ross.* ii. 673.

WESTERN TIBET, KUNAWUR, and LAHUL, alt. 14–18,000 ft.; from Nubra to the north of Kumaon, *Falconer*, &c.—DISTRIB. Altai Mts.

A much smaller plant than any of the foregoing species of *Eriocoryne*, of tufted habit, the rootstock branching repeatedly; the leaves vary greatly in length and form; the flowering stem, when produced, is hollow at the top which is much dilated under the heads, as in its allies; the heads do not differ materially from those of *S. gossypiphora*, but the bracts are very membranous and glabrous, or silky at the tips; the pappus is pale brown or dull blue; achenes not ripe.

VAR.? *glabrata*; stem 1–2 in., leaves longer narrower toothed, cauline glabrous, floral woolly, outer pappus hairs 0 or deflexed on the achene.—Western Tibet, alt. 15–18,000 ft., *H. Strachey*; Sassar, *Thomson*.

90. GONIOCAULON, *Cass.*

An erect glabrous branched annual; stem acutely 4–8-angled. *Leaves* narrow, alternate, toothed. *Heads* narrow, fascicled and corymbose, homogamous: flowers few, all ☿, fertile and similar, tube slender; limb longer, cylindric, 5-fid to the middle or lower. *Involucre* oblong, base very narrow; bracts ∞-seriate, pale, very narrow, rigid, acute, erect, not spinescent, outer gradually shorter; receptacle very narrow, paleaceous. *Filaments* hairy; anther-bases sagittate, connate, tails short. *Style-arms* filiform. *Achenes* glabrous, oblong, subcylindric, about 20-ribbed, basal areole straight; pappus scales ∞-seriate, very unequal.

1. **G. glabrum,** *Cass. in Bull. Soc. Phil.* 1818, and in *Dict. Sc. Nat.* xix. 201. G. indicum, *Clarke Comp. Ind.* 236. Amberboa indica, *DC. Prodr.* vi. 558; *Wight Ic.* t. 479; *Dalz. & Gibs. Bomb. Fl.* 131. A. Goniocaulon, *DC. l. c.* Athanasia indica, *Roxb. Fl. Ind.* iii. 417; *Wall. Cat.* 2919. Serratula indica, *Wall. Cat.* 2919.

CENTRAL INDIA and the DECCAN; from Banda and Indore, *Edgeworth*, southwards, especially in high lands lately under cultivation, *Roxburgh*.

Stem 1–3 ft., strict, erect, ribbed on and between the angles, with a straight tap

root, branched or simple below, corymbose above. *Leaves* 2–4 in., sessile, ½-amplexicaul, linear-obovate or subspathulate, toothed, base narrowed. *Heads* ½–⅔ in., narrow, pedicelled, fascicled in compound corymbs, erect, pale; corollas about 5, rose-purple.—Roxburgh observes that it is not uncommon to see fields of this as thick as if the plants were sown by a careful farmer.

91. JURINEA, *Cass.*

Annual or perennial herbs. *Leaves* entire toothed or pinnatifid, rarely armed, more or less tomentose. *Heads* homogamous; flowers all ☿, similar, purple; tube slender, limb elongate 5-fid to the middle or lower. *Invol. bracts* ∞-seriate, imbricate, innermost narrow erect, outer shorter; receptacle flat, densely bristly. *Filaments* free, glabrous; anther-bases sagittate, auricles usually connate, tails elongate. *Style-arms* short. *Achenes* glabrous, 4–5-angled, rarely compressed, smooth or 1–3-ribbed between the angles, basal areole nearly straight; pappus hairs ∞-seriate, very unequal, rigid, simple barbellate or feathery, persistent or deciduous.—Distrib. About 40 species, Europe, and W. and Central Asia.

1. **J. ceratocarpa,** *Benth. in Gen. Plant.* ii. 474; scaberulous, stemless or stem erect much branched, leaves linear-oblong or lanceolate entire or pinnatifid green on both surfaces or white-tomentose beneath, heads sessile or terminating the branches 1–1½ in. diam. bracteate by linear leaves, invol. bracts lanceolate acuminate, recept. bristles longer than the achenes, anther-tails long laciniate, achenes 4–5-angled, angles thickened ending in erect spines. *Clarke Comp. Ind.* 236. Saussurea ceratocarpa, *Dcne. in Jacquem. Voy. Bot.* 93, t. 101. ? S. stemmaphora, *Klatt in Sitzungsb. Münch. Akad.* 1878, 93.

Kashmir, alt. 9–15,000 ft., *Falconer,* &c.

Stem 0–2 ft., or plant branched from the base in the larger forms, branches very stout leafy. *Leaves* 2–5 in., radical and lower cauline usually runcinate, petioled; upper sessile, base auricled. *Heads* stoutly pedicelled; outer invol. bracts linear, green; inner very slender, erect or recurved; corolla ½ in. *Achenes* ¼ in., rough, brown; outer pappus bristles few scabrid, inner very slender, ⅓ in., white.

Var. *depressa,* Clarke mss.; stemless or nearly so. Saussurea acanthocarpa, *Schultz-Bip. mss.*—Western Tibet and Kashmir, alt. 13–15,000 ft., abundant; Garwhal, at Gothing, alt. 13,500 ft., *Strach. & Winterb.*

2. **J. macrocephala,** *Benth. in Gen. Pl.* ii. 474; stemless, leaves oblong-lanceolate pinnate or pinnatifid lobes broad lobulate or pinnatifid denticulate cobwebby or cottony above thickly white-tomentose beneath, heads many ⅔–1 in. diam. sessile or shortly peduncled, outer invol. bracts ovate-lanceolate inner elliptic-lanceolate long-acuminate, recept. bristles united into laciniate cups, anther-tails lacerate, achenes large cuneate-obovate angled tubercled. *Clarke Comp. Ind.* 237. Dolomæa macrocephala, *DC. in Guill. Arch. Bot.* ii. 330; *Prodr.* vi. 542; *Deless. Ic. Sel.* iv. t. 70; *Royle Ill.* 251, t. 57. Serratula macrocephala, *Wall. Cat.* 2904.

Western Himalaya; from Kashmir to Kumaon, alt. 11–14,000 ft.

Root woody, perennial. *Leaves* spreading, 6–18 by 1½–7 in., long- or short-petioled, lobes or segments contiguous broad sometimes crisped, teeth acute or mucronate. *Heads* 3–30; peduncles stout, tomentose often cottony at the base; invol. bracts ¾–1¼ in., scabrid or smooth, erect, scarious; recept. bristles very rigid, much shorter than the achenes; corolla 1–1¼ in. *Achenes* ¼–⅓ in., curved, compressed, unequally 1–5-angled, truncate, ashy grey; pappus copious, 1 in., brown, hairs cohering at the base. "The roots, called Dhup, are collected and used by Hindoos as incense." *Aitchison.*

3. **J. modesta,** *Boiss. Fl. Orient.* iii. 584; annual, cobwebby, stem branched from the base, branches short ascending ending in very long leafless

slender 1-headed cottony peduncles, leaves sessile decurrent lanceolate acute quite entire or sinuate-toothed, heads 1 in. diam., invol. bracts appressed, outer ovate acuminate lanceolate green with scarious margins, inner elongate, recept. bristles half as long as the involucre, anther-tails subentire, achenes obconic compressed angles thickened pale smooth shining, pappus hairs many-seriate very unequal rough persistent.

WESTERN PUNJAB; Peshawur, *Vicary*.—DISTRIB. Affghanistan.

Whole plant 6–12 in. high. *Leaves* 2–3 in. *Heads* pale; invol. bracts sparsely cottony, inner sometimes red; corolla ½ in.; tube very slender, limb inclined. *Achenes* ⅕ in., crowned with the stout thickened base of the style; pappus ⅓ in., white, shining, innermost hairs very stiff, two much longer than the others and flattened.—Boissier's description is drawn up from very imperfect materials. The basal areole of the achene refers this plant to *Jurinæa*, but it is a *Serratula* in habit.

DOUBTFUL SPECIES.

J. ROSULATA, *Klatt in Sitzungsb. Münch. Akad.* 1878, 96; from the Punjab and Kashmir.—The few words of description does not enable me to say whether this is a *Jurinea* or not; the appendaged invol. bracts produced into a long spine are unlike those of any Indian species.

J. GNAPHALIOIDES, *Klatt l. c.*; also from the Punjab.—This also is undeterminable from the meagre description.

92. SERRATULA, *Linn.*

Perennial herbs. *Leaves* alternate, toothed or pinnatifid. *Heads* corymbose, subsolitary, homogamous; flowers all ☿, similar, purple violet or white, all sub-oblique or regular, tube slender, limb elongate 5-fid. *Involucre* ovoid or globose; bracts ∞-seriate, inner narrow elongate, outer shorter broader acute or awned not spinescent rarely obtuse or with a lanceolate appendage; receptacle bristly. *Filaments* glabrous; anther-bases sagittate; auricles connate, shortly mucronate or tailed. *Style* hairy or with a hairy ring below the slender arms. *Achenes* glabrous, oblong, subterete or obtusely angled, basal areole very oblique; pappus bristles ∞-seriate, rigid, serrulate, unequal, outer often very short.—DISTRIB. About 30 species, Europe, N. Africa, West Central and Alpine Asia.

1. **S. pallida,** *DC. Prodr.* vi. 670; glabrous or scaberulous, stem simple or divided below, branches ending in long leafless 1-headed peduncles, leaves polymorphous from broadly ovate or oblong and toothed to linear and deeply runcinate pinnatifid, heads 1–1½ in. diam., invol. bracts appressed, outer ovate acute, inner linear-oblong with scarious obtuse tips, recept. bristles longer than the obovate obcompressed smooth pale achenes. *Clarke Comp. Ind.* 237. Centaurea pallida, *Wall. Cat.* 2983.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–8000 ft.

Stem 1–3 ft., simple or sparingly branched from the tomentose base, stout or slender, usually scaberulous or puberulous. *Leaves* glabrous or young pubescent, radical with long slender petioles, in the largest forms 8–12 by 5–6 in., acute or obtuse, sharply toothed, base entire cordate rounded acute or cut into short lobes; in more ordinary forms 4–6 by 1–2½ in., deeply pinnatifid or runcinate, with a toothed terminal and oblong or triangular acute entire or toothed lateral lobes; in smallest forms ½–1 in. long. *Heads* broad; peduncle stout or slender, often 18 in.; invol. bracts glabrous; corolla ¾ in.; anther-tails short, entire. *Achenes* ⅕ in., obovoid-oblong, broad, flattened, pale, quite smooth, obscurely ribbed; pappus hairs rigid, ⅓ in., brown.

93. TRICHOLEPIS, *DC.*

Annual or perennial branched unarmed herbs. *Leaves* entire toothed or the lower pinnatifid, often with raised dots on the surfaces. *Heads* terminal, soli-

tary, peduncled, homogamous; flowers all ☿, similar, fertile, yellow red or purple, regular or suboblique, tube slender, limb 5-cleft to the middle. *Involucre* ovoid or broader; bracts ∞-seriate, very narrow, usually with long recurved hair-points or mucronate, the outer shorter; receptacle densely bristly. *Filaments* papillose; anther-bases sagittate, auricles connate, tails slender lacerate. *Style-arms* slender. *Achenes* glabrous, oblong or obovoid, smooth, ribbed, basal areole lateral, terminal areole small or broad; pappus bristles ∞-seriate and very unequal, serrulate barbellate or feathery, long and slender or short and paleaceous, or 0.—Distrib. Species 7, all Indian or Affghan.

* *Pappus hairs scabrid, connate, not or slightly flattened below; corolla yellow.*

1. **T. Karensium,** *Kurz in Journ. As. Soc.* 1872, ii. 318, 1877, ii. 202; tall, erect, woody, villous above with 1–3 heads, upper leaves 3–4 in. lanceolate entire or denticulate puberulous or cottony beneath, heads 2½ in. diam. very large bracteate by the upper leaves, invol. bracts innumerable elongate-subulate spreading and incurved rigid white, recept. bristles linear equalling the feathery pappus, achenes oblong 4–5-ribbed smooth, pappus hairs barbellate connate at the base, outer short. *Clarke Comp. Ind.* 238 (*T. Karensis*).

Birma; Karen hills, *O'Riley & Mason.*

Much the largest Indian species. I have seen only a very imperfect specimen, and have taken the characters chiefly from Clarke: the invol. bracts are quite acicular, in very many series, the inner gradually longer, innermost 1½ in., outermost ⅙ in., all rigid but not pungent, densely ciliate with spreading hairs.

2. **T. furcata,** *DC. Prodr.* vi. 563; glabrous or puberulous, branched from the base, branches elongate ending in a long-peduncled head, leaves shortly petioled elliptic or lanceolate acute or acuminate denticulate covered with raised points or scaberulous above and beneath or pubescent beneath, heads 1½ in. nodding ebracteate, invol. bracts acicular or filiform from a lanceolate base recurved ciliate tips black, recept. bristles shorter than the narrowly oblong ribbed smooth achenes, pappus hairs scabrid connate at the base, outer shorter. *Clarke Comp. Ind.* 238. T. nigrescens, *Edgew. in Trans. Linn. Soc.* xx. 77. Carduus trichocephalus, *Wall. Cat.* 2901.

Temperate Himalaya; from Kashmir to Bhotan, alt. 5–10,000 ft.

Stem 2–6 ft., slender. *Leaves* 2–6 by 1½–2½ in., smooth or scaberulous above. *Invol. bracts* very spreading in fruit; corolla ¾–1 in., nearly straight, yellow; anther-tails subentire. *Achenes* ¼ in., pale, compressed; pappus hairs very slender, soft, inner 1 in., white. I can detect no character whereby to separate *T. nigrescens*; the amount of ciliation of the bracts varies greatly.

3. **T. Stewartei,** *Clarke mss.*; branches rigid leafy, leaves sessile lanceolate acuminate minutely toothed quite glabrous veins indistinct, heads shortly peduncled 1 in. diam., invol. bracts acicular from an ovate woolly base pale, recept. bristles longer than the achenes, pappus rigid.

Punjab; in the Jhelum valley, *Stewart.*

Apparently a very distinct species, of which I have seen only tips of branches with imperfect flowers. *Leaves* 1½ in., rather coriaceous. *Invol. bracts* yellowish when dry, inner ¾ in. long. *Pappus* ⅓ in. long, pale, brown.

4. **T. elongata,** *DC. Prodr.* vi. 563; pubescent or scaberulous, stem and branches strict, leaves sessile linear oblong-lanceolate elliptic or obovate acute or obtuse toothed serrate or distantly runcinate, heads ½–1 in. diam., invol. bracts acicular from an ovate base ciliate tips black or not, recept. bristles longer than the 5-angled smooth pale achenes, pappus hairs in many rows short, inner flattened below. *Clarke Comp. Ind.* 239. Carduus elongatus, *Wall. Cat.* 2900, 2909. T. lanuginosa, *Klotzsch in Reise Pr. Wald. Bot.* 79, t. 81.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–8000 ft.

Stem 2–5 ft., sparingly branched. *Leaves* very variable, surface covered with raised points or scaberulous or pubescent, in the largest specimens 4 by 1½ in., toothed and pinnatifid at the base as in the largest leaved form of *Saussurea pallida*; in others 2 by ⅔ in., oblanceolate and regularly coarsely serrate; in others linear and pinnatifid or serrate above and pinnatifid towards the base. *Heads* erect or suberect, like those of *T. furcata*; corolla ½–⅔ in., yellow. *Achenes* ⅕ in., acutely angled, narrowly oblong, slightly broader upwards, truncate; pappus ¼ in., copious, pale brown, shining.

** *Pappus-hairs scabrid, not connate at the base, flattened below, or scanty or* 0; *corolla red or lilac.*

5. **T. radicans,** *DC. Prodr.* vi. 584; slender, glabrous, smooth or scaberulous, much branched from the base, branches decumbent or erect, leaves covered with raised points sessile ½-amplexicaul linear obovate oblong or spathulate remotely irregularly toothed or pinnatifid, heads ½–⅔ in. on slender naked glabrous peduncles, outer invol. bracts acicular from an ovate base recurved, inner more lanceolate, recept. bristles longer than the oblong compressed smooth achenes which are longer than the very short flattened pappus-hairs. *Clarke Comp. Ind.* 239; *Dalz. & Gibs. Bomb. Fl.* 131. Carduus radicans, *Roxb. Fl. Ind.* iii. 408; *Wall. Cat.* 2907.

WESTERN PENINSULA; from the Circars and Bombay southwards.

Annual, 6–18 in. high, branches angular, rarely erect and stout. *Leaves* 1–3 in., membranous, teeth mucronate or bristle-pointed. *Heads* on very slender peduncles, erect; corolla ⅓ in., lilac. *Achenes* ⅕ in., obovoid or oblong, compressed, truncate, sides rounded, faces with very many slender ribs, pale, shining, almost twice as long as the scabrid flattened hairs of the pale brown pappus.

6. **T. amplexicaulis,** *Clarke Comp. Ind.* 240; quite glabrous, erect, rigid, stem stout and branches angled and ribbed quite smooth, leaves linear-oblong from a dilated auricled toothed ½-amplexicaul base finely toothed or ciliate covered with raised points, heads ¾–1 in. on short stout angular peduncles glabrous or puberulous bracteate by linear leaves, invol. bracts acicular from a linear base recurved, recept. scales much longer than the broadly oblong smooth achenes, pappus 0 or of a few bristles.

WESTERN PENINSULA; Canara and Mysore, *Dalzell, Law.*

Annual, very stout, 3–5 ft.; stem and branches shining. *Leaves* 3–5 by ½–1½ in., rigid, quite glabrous, pale when dry. *Invol. bracts* often tipped with black; corolla ½–⅔ in. *Achenes* ⅕ in. long, compressed, perfectly smooth, glossy, pale brown, sides rounded, top rounded with a very small apical areole, basal areole broad, very oblique.

VAR. *β*, leaves 2–1½ in., elliptic, obovate acute denticulate teeth mucronate.—Concan, *Dalzell.*

7. **T. glaberrima,** *DC. Prodr.* vi. 564; quite glabrous, erect, rigid, stem slender and branches angled and ribbed quite smooth, leaves sessile linear-oblong or -lanceolate acute entire or serrate scaberulous and covered with raised points base simple or auricled, heads small ¼–⅓ in. diam., invol. bracts subulate from a lanceolate base erect, recept. bristles exceeding the pappus, achenes oblong faintly ribbed, twice as long as the pappus. *Clarke Comp. Ind.* 240; *Dalz. & Gibs. Bomb. Fl.* 131; *Dcne. in Jacq. Voy. Bot.* 98, t. 106. ? Serratula indica, *Willd. Sp. Pl.* iii. 1642.

CENTRAL INDIA; Indore, *Edgeworth.* MARWAR; Mt. Aboo, *King.* The CONCAN and DECCAN, common, *Dalzell*, &c.

Habit of *T. amplexicaulis*, but more slender, with much smaller heads, straight

more subulate shorter invol. bracts, distantly ribbed achenes, and conspicuous though short pappus; the leaves also are more entire and have stronger nerves.

8. **T. angustifolia,** *DC. Prodr.* vi. 564, *excl. syn.*; quite glabrous, very slender, branches spreading angled quite smooth, leaves sessile but not amplexicaul lower obovate upper linear-oblong all entire or subserrate covered with raised points, heads small $\frac{1}{3}$–$\frac{1}{2}$ in. diam. ovoid on slender peduncles, invol. bracts acicular from a lanceolate base recurved glabrous, recept. bristles longer than the oblong smooth faintly ribbed achenes, pappus 0. *Clarke Comp. Ind.* 240.

WESTERN PENINSULA; Travancore, *Klein*; Mangalore, *Hohenacker*; Canara, *Thomson*.

A very slender species, at times resembling in habit *T. radicans*, at others more erect with longer straighter branches, small heads, and achenes like those of *T. amplexicaulis*, but only $\frac{1}{8}$ in. long.

9. **T. tibetica,** *Hook. f. & T. in Clarke Comp. Ind.* 241; woody below, quite glabrous, branches erect cylindric quite smooth, leaves small sessile coriaceous scattered without raised points, lower distantly pinnatifid upper ovate linear entire base simple, heads $\frac{1}{2}$–$\frac{2}{3}$ in. diam. scaberulous, outer invol. bracts ovate-subulate inner subulate-lanceolate rigid suberect, recept. bristles longer than the linear-oblong silvery truncate achenes, pappus a brush of compressed bristles twice as long as the achenes.

WESTERN TIBET and NORTHERN KASHMIR; alt. 8–12,000 ft., *Falconer*, &c. – DISTRIB. Affghanistan.

A corymbosely branched undershrub, about a foot high, naked below; branches slender, virgate, terminating in a strict peduncle with a small erect head. *Leaves* 1–3 in. long, very narrow, obtuse, lobes of the pinnatifid ones few spreading or recurved triangular or oblong acute, upper $\frac{1}{2}$ 1 in., $\frac{1}{10}$–$\frac{1}{8}$ in. diam., subacute. *Invol. bracts* appressed, minutely seabrid, inner $\frac{1}{2}$ in. long; corolla red, more than $\frac{1}{2}$ in. long. *Achenes* (unripe) $\frac{1}{6}$ in., obscurely ribbed, top with a distinct broad rim to which the pappus is attached, basal areole very oblique; pappus-hairs $\frac{1}{3}$ in. long, nearly white, one or two of the innermost often much longer than the rest, and flattened as in *Jurinea modesta* and *Volutarella divaricata*.—This has the habit, truncate achene, and pappus of *Jurinea chætolepis*, Boiss., from Affghanistan (Tricholepis spartoides, *Clarke Comp. Ind.* 241), which has the involucre of a *Tricholepis*, and the oblique basal areole of the achene, and is rightly referred to the latter genus by Clarke.

*** *Pappus-hairs feathery.*

10. **T. stictophyllum,** *Clarke Comp. Ind.* 241; quite glabrous, stem 0 or 6–12 in. sparingly branched from the base, branches angular grooved leafy below, leaves sessile $\frac{1}{2}$-amplexicaul linear or ligulate quite entire or obscurely toothed acute covered with obscure raised points, nerves parallel to the midrib, heads 1–1$\frac{1}{2}$ in. diam. at the naked ends of the branches glabrous, invol. bracts appressed glabrous outer ovate acuminate inner linear-lanceolate with erect flexuous tips, recept. bristles longer than the linear-oblong compressed many-ribbed truncate achenes, pappus copious of slender feathery hairs. Stictophyllum glabrum. *Edgew. in Trans Linn. Soc.* xx. 78. Cnicus angustifolius, *Wall. Cat.* 2915.

WESTERN HIMALAYA; Garwhal at Kansrow Ghat, *Falconer*; Subsiwalik hills, in grassy places, *Edgeworth*. CENTRAL INDIA (probably Saugur), *Jerdon*.

Root perennial?; habit subscapigerous. *Leaves* 3–5 by $\frac{1}{4}$–$\frac{1}{2}$ in., flat, quite smooth; midrib slender. *Heads* rarely 2 together; invol. bracts $\frac{1}{2}$–$\frac{2}{3}$ in.; corolla $\frac{2}{3}$ in., straight. *Achenes* $\frac{1}{3}$ in. long, pale, margins rounded, basal areole very oblique, top rather dilated, as in *T. tibetica*; pappus $\frac{1}{3}$ in. long, soft, silvery brown, hairs slightly united at the base.—An anomalous plant, with the habit and involucre of *Serratula*, and the pappus of *Jurinea*; the achene is, however, quite that of *Tricholepis tibetica*, and

different from that of other species of the genus, with which, however, it agrees in the leaves having raised points (whence the name *Stictophyllum*, Edgeworth). Wallich's specimen, from Herb. Hamilton, has no habitat.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

T. MONTANA, *Dalz. & Gibs. Bomb. Fl.* 131; "a coarser species (than *T. glaberrima*), leaves obovate-oblong very coarsely toothed or sometimes pinnatifid; differs from *T. angustifolia* also in having long slender stigmas."—The Ghats. I know nothing of this species.

T. ROYLEI, *Hook. f.*; shrubby, branches petioles and leaves beneath densely clothed with cottony tomentum, leaves 3 by 1½ in. elliptic or ovate subacute toothed glabrate above with raised points, petiole ⅓ in., head solitary terminal large erect 2 in. diam., peduncle stout, invol. broadly campanulate cottony, bracts very numerous outer appressed small ovate with appressed spinous points, innermost linear-lanceolate 1 in. long with softer subrecurved points, filaments papillose, anther-tails toothed, achenes?, pappus ½ in. scabrid pale yellow red. Jurinea? Tricholepis, *DC. Prodr.* vi. 678.—N.W. India, *Royle*. I have seen very imperfect specimens of this very distinct species, which though referred by De Candolle doubtfully to *Jurinea* is, as far as can be judged in the absence of achenes, clearly a *Tricholepis*.

94. VOLUTARELLA, *Cass.*

Annuals. *Leaves* alternate. *Heads* heterogamous, purple violet or blue; outer fl. 1-seriate, neuter; disk-fl. ☿, fertile, tube slender short, limb cylindric 5-fid. *Involucre* ovoid or globose; bracts ∞-seriate, innermost narrow acute; outer shorter, acute, awned or spinescent; receptacle flat, densely bristly. *Filaments* glabrous or hairy; anther-bases sagittate, auricles connate shortly tailed. *Style* filiform, arms free or connate. *Achenes* obovoid or oblong, subulate or angled, 5-15-ribbed, often striate and pitted between the ribs; basal areole oblique or lateral; pappus bristles ∞-seriate, outermost gradually shorter, innermost 2–4 dilated and flattened.—DISTRIB. Species 4 or 5, S. Europe, N. Africa, W. Asia and India.

V. divaricata, *Benth. in Gen. Pl.* ii. 476, *excl. some syns.*; dichotomously branched, spreading, leaves oblong or obovate entire toothed or pinnatifid, lobes mucronate often undulate or crisped, heads ½-in. diam., invol. bracts ovate with a long spreading or recurved spinescent awn, achenes 4–5-angled striate and punctate. *Clarke Comp. Ind.* 242; *excl. syns.* Tricholepis procumbens, *Wight Ic.* t. 1139; *Dalz. & Gibs. Bomb. Fl.* 131. T. Candolleana, *Wight in Hook. Comp. Bot. Mag.* i. 81, t. 4. Microlonchus divaricatus, *DC. Prodr.* vi. 562. Centaurea divaricata, *Wall. Cat.* 2984. Carduus ramosus, *Roxb. Fl. Ind.* iii. 407.

CENTRAL, WESTERN and SOUTHERN INDIA; from Behar and the upper Gangetic plains to Lahore; and from Scind to Mysore and the Deccan; ascending to 3000 ft. in the N.W. Himalaya.—DISTRIB. Affghanistan, Beluchistan.

An annual straggling stiff weed, troublesome from its hard head with spiny invol. bracts; branches 1–2 ft. long, angled, smooth or scabrid. *Leaves* very variable 1–2 by ¼–⅔ in., rarely 6 by 3 in., sessile, base simple, lobes rounded. *Invol. bracts* glabrate reddish, spines ¼–⅓ in. smooth; receptacular bristles short; corolla ½ in., straight, pale purple. *Achenes* ⅕ in., narrow, acutely angled, grooved and punctate between the angles, base narrow; areole small lateral deeply excavated, top broad truncate; pappus spiny of many unequal scaberulous hairs ½ in. long, silvery brown, 3 or 4 innermost flattened and long.—In the Genera Plantarum, *Centaurea patula*, DC., and *Serratula divaricata*, Fisch. & Mey., are erroneously (as Boissier has pointed out, Fl. Orient. iii. 605, 701) referred to this.

94*. ZOEGIA, *Linn.*

Slender erect branched annuals. *Leaves,* radical pinnatifid, cauline entire. *Heads* long-peduncled, heterogamous; flowers purple, outer 1-seriate, neuter; disk-fl. ☿, fertile, tube slender, limb 5-fid to or below the middle. *Involucre* ovoid or globose; bracts membranous, ∞-seriate, outer shorter pectinately ciliate, inner entire tips ciliate violet; receptacle densely bristly. *Filaments* glabrous; anther-bases sagittate, auricles minute connate. *Style* entire or emarginate. *Achenes* obovoid, compressed, shining, obscurely ribbed, basal areole lateral, top truncate crowned with 1–4 concentric ridges; pappus double or triple, outermost, if present, of short chaffy scales, middle one of long smooth bristles, inner of short bristles.—DISTRIB. 2–4, Mediterranean and Oriental.

1. **Z. purpurea,** *Fresen.*; *Boiss. Fl. Orient.* iii. 698; 8–12 in., glabrous or puberulous, very slender, invol. bracts deeply pectinately ciliate, inner with long hair points, outer pappus of oblong chaffy scales, middle white longer than the glabrous achene, inner short subulate. Z. aristata, *DC. Prodr.* vi. 562.

NORTH WEST INDIA; between Kashmir and Wuzuristan, *Stewart.*—DISTRIB. Westward to Persia, Arabia and Egypt.

The specimens are small and withered, but I think referable to *Z. purpurea.* The outer chaffy pappus of this species is nowhere described. A very elegant plant, with bright purple tips to the invol. bracts.

95. CENTAUREA, *Linn.*

Herbs, often rigid. *Leaves* radical and alternate, entire toothed or pinnatifid. *Heads* solitary corymbose or panicled, heterogamous (rarely homogamous), purple, violet, blue, white or yellow; outer-fl. 1-seriate, neuter; disk-fl. ♀, fertile, tube slender, limb straight or oblique 5-fid to the middle or lower, of neuter fl. often larger with a spreading limb. *Involucre* ovoid or globose; bracts ∞-seriate, imbricate, appressed, margins scarious or coriaceous, or ending in a simple or palmately divided spine or a pectinate appendage; receptacle flat, densely bristly. *Anther-bases* sagittate; auricles connate, tails long or short entire or lacerate. *Style-arms* with a thickened hairy basal ring, erect and connate or shortly spreading. *Achenes* oblong or obovoid, compressed or obtusely 4-angled, often shining, basal areole oblique or lateral; pappus very various, bristles rigid or paleaceous, ∞-seriate, entire serrulate bearded or feathery, rarely 0.—DISTRIB. Species about 320, European and W. Asiatic, with a few N. & S. American and one Australian.

The *Centaureas* are immigrants from the west into India and except perhaps *C. iberica* and *C. phyllocephala,* are visitors rather than even denizens.

1. **C. Cyanus,** *Linn.*; *Boiss. Fl. Orient.* iii. 634; annual or biennial, erect, slender, cottony, leaves narrow radical entire or lyrate-pinnatifid cauline linear, heads ovoid, invol. bracts oblong obtuse cottony, tip broad with brown scarious toothed margins which are decurrent on the sides of the bract teeth triangular, ray-flowers large spreading blue, achenes grey silky longer than the middle row of pappus-hairs. *DC. Prodr.* vi. 578; *Clarke Comp. Ind.* 242. C. lanata, *Roxb. Fl. Ind.* iii. 644.

In corn fields and cultivated places of N.W. INDIA; sporadic.—DISTRIB. The Caucasus and westward to the Atlantic.

The common corn-cockle of England.

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* The genus *Zoegia* is omitted in the conspectus of genera, p. 225, where its diagnostic character would be *achenes* with concentric ridges below the top. It is doubtful whether it was found within the British border.

2. **C. depressa,** *M. Bieb.*; *Boiss. Fl. Orient.* iii. 635; annual, appressed-tomentose or hoary, stem simple or branched, lower leaves petioled entire or pinnatifid, cauline linear-lanceolate, heads ovoid, invol. bracts glabrous margins scarious white or brown toothed, teeth lanceolate white, ray-flowers large spreading blue, achenes shining puberulous equalling or shorter than the middle row of pappus-hairs, basal areole bearded. *DC. Prodr.* vi. 578; *Clarke Comp. Ind.* 243.

NORTH WEST INDIA, *Royle.* WESTERN TIBET,; Ladak, *Stoliczka,* sporadic.—DISTRIB. Affghanistan and westward to Asia Minor.

Heads larger than *C. Cyanus,* and leaves broader.

3. **C. melitensis,** *Linn.*; *Boiss. Fl. Orient.* iii. 686; pubescent tomentose or glabrate, erect, branches strict rigid narrowly winged, radical leaves lyrate-pinnatifid cauline linear decurrent, heads small ovoid, invol. bracts ending in a spreading and recurved spine margins spinulose, flowers yellow, achenes minute puberulous produced below the basal areole. *DC. Prodr.* vi. 593; *Clarke Comp. Ind.* 243.

NILGHERRY MTS.; alt. 6–7000 ft., sporadic.—DISTRIB. Westwards to the Atlantic.

4. **C. Calcitrapa,** *Linn.*; *Boiss. Fl. Orient.* iii. 689; branches angular spreading from the base, leaves spreading pubescent radical pinnatifid or pinnate, lobes linear toothed cauline sessile uppermost entire, heads ovoid lateral and terminal sessile or peduncled, invol. bracts with narrow membranous margins terminating in a long strong spreading spine with short lateral ones at its base, flowers purple, achenes small white, pappus 0. *DC. Prodr.* vi. 597; *Clarke Comp. Ind.* 243.

NORTH WESTERN INDIA; the Punjab and Kashmir, ascending to 3500 ft. MYSORE; sporadic.—DISTRIB. Western Asia and Europe, introduced in most parts of the world.

Cottony or glabrous, rigid. *Branches* 1–2 ft. long. *Heads* $\frac{1}{2}$–$\frac{2}{3}$ in. diam. exclusive of the yellow spines. *Achenes* mottled.

5. **C. iberica,** *Stev.*; *Boiss. Fl. Orient.* iii. 690; characters of *C. Calcitrapa,* but heads smaller, flowers paler and achenes with a very short pappus.

KASHMIR, alt. 5–6000 ft., *Thomson.*—DISTRIB. Westward to the Atlantic.

6. **C. phyllocephala,** *Boiss. Fl. Orient.* iii. 684; glabrous or hispid, branches wide-spreading cylindric white, leaves small sessile lower lanceolate entire or pinnatifid margins spinulose-toothed and scabrid, cauline with amplexicaul cordate bases, heads small terminal, outer invol. bracts ending in oblong pectinately ciliate leaves, inner entire white ending in a long strong spine, innermost acuminate, achenes minute longer than the paleaceous pappus. *Clarke Comp. Ind.* 244. Tetramorphæa Bruguiseriana *and* Belangeriana, *DC. Prodr.* vi. 609.

The PUNJAB, *Falconer*; Peshawur, *Stewart.*—DISTRIB. Westwards to Asia Minor.

A very pretty species, easily recognised by the white terete branches and green outer invol. bracts.

96. CARTHAMUS, *Linn.*

Thistle-like herbs. *Leaves* alternate, rigid, spinescent. *Heads* usually homogamous; fl. all ☿, fertile (rarely a few marginal ♀ or neuter) and similar, yellow white or purplish, tube slender; limb oblong, dilated at the base, 5-cleft (or 0 in ♀ fl.). *Involucre* ovoid or subglobose; bracts ∞-seriate, inner dry entire or with a short fimbriate appendage, outer with a foliaceous toothed or spinescent appendage (sometimes absent in cultivated specimens); receptacle flat, densely bristly. *Filaments* usually hairy in the middle; anther-bases sagit-

tate, auricles connate, tails short fimbriate. *Style-arms* short or long. *Achenes* glabrous, obovoid, 4-angled or compressed, basal areole oblique or lateral, all or the outer only without pappus, or all or the inner only with paleaceous ∞-seriate pappus.—DISTRIB. Species about 20, of the Mediterranean region extending into Asia.

1. **C. tinctorius,** *Linn.*; *Boiss. Fl. Orient.* iii. 709; glabrous or pubescent, leaves entire and unarmed or spinulose-serrate, outer invol. bracts ovate-oblong constricted above the base green spinous or not, inner ovate-oblong acute, flowers orange-red, achenes (often deformed) obovoid 4-angled truncate at the top with 4 bosses, pappus 0. *DC. Prodr.* vi. 612; *Reichb. Ic. Fl. Germ.* t. 746; *Roxb. Fl. Ind.* iii. 409; *Wall. Cat.* 2959; *Clarke Comp. Ind.* 244.

Cultivated throughout INDIA.—The Safflower.

2. **C. oxyacantha,** *Bieb.*; *Boiss. Fl. Orient.* iii. 709; puberulous, stem and branches white, leaves oblong or oblong-lanceolate lower shortly spinulose-toothed upper ½-amplexicaul very spinous, outer invol. bracts exceeding the head white below the contracted portion green above it with yellow spines, flowers orange-yellow, achenes obovoid 4-angled smooth shining truncate at the top with 4 bosses, pappus 0. *DC. Prodr.* vi. 612; *Clarke Comp. Ind.* 244.

The PUNJAB; from Lahore westward, *Royle*, &c.—DISTRIB. Westward to the Caucasus.

Perhaps the wild form of the Safflower, *C. tinctorius* (Clarke).

3. **C. lanatus,** *Linn.*; *Boiss. Fl. Orient.* iii. 706; very rigid, cobwebby cottony or glabrate, stem strict erect, leaves hispid or scaberulous, radical lyrate-pinnatifid, cauline ovate ½-amplexicaul with an auricled toothed base strongly 3-nerved spinescent, heads large, outer invol. bracts large far exceeding the flowers lanceolate leafy spinescent on the sides, inner entire, flowers pale yellow, achenes thick very broad turbinate obtusely 4-angled smooth pitted above, pappus longer than the achenes of narrow linear acute shining elastic pales. *Bot. Mag.* t. 2142; *Clarke Comp. Ind.* 707. Kentrophyllum lanatum, *DC. Prodr.* vi. 610. Carduncellus lanatus, *Reichb. Ic. Fl. Germ.* t. 746.

KASHMIR, alt. 5–6000 ft., *Falconer*, &c.—DISTRIB. Westward to the Atlantic.

Stem 6–18 in. terete. *Leaves* ½–1½ in., spreading, hard, green. *Heads* 1–1½ in. diam.; outer bracts 1–2 in., spreading; lower linear, scariously coriaceous, brown, tip spinescent; recept. bristles very long. *Achenes* ¼ in., pale yellowish or grey, pericarp crustaceous; pappus pales narrowly sword-shaped, unequal, very beautiful, silvery or rich bronze-coloured.

TRIBE X. MUTISIACEÆ.

97. LEUCOMERIS, *Don.*

Shrubs or small trees. *Leaves* alternate, broad, quite entire. *Heads* corymbose, homogamous, discoid, 4–8-fld., white; fl. all ☿, similar and fertile, tubular, segments 5 narrow revolute. *Involucre* much shorter than the flowers, ovoid; bracts ∞-seriate, ovate or lanceolate, coriaceous or dry, outer smaller; receptacle flat, naked. *Anther-bases* sagittate, auricles connate, tails ciliate. *Style* filiform, obtuse, 2-fid. *Achenes* oblong, subterete, 5-ribbed, silky; pappus copious, hairs very slender, scabrid, outer shorter.—DISTRIB. 2 Indian species.

1. **L. spectabilis,** *Don Prodr.* 170; leaves elliptic or elliptic-lanceolate densely velvetty-tomentose beneath, invol. bracts few linear-oblong obtuse or acute glabrous, pappus pale. *Wall. Pl. As. Rar.* ii. 8, t. 3; *DC. Prodr.* vii. 25; *Deless. Ic. Sel.* iv. t. 78; *Clarke Comp. Ind.* 245. L. macrophylla, *DC. l. c.* Eupatorium candicans, *Wall. Cat.* 2999. E. spectabile, *Spreng. Syst.* iii. 410.

Gochnatia spectabilis, *Less. in Linnæa*, v. 26. Conyza candicans, *Wall. Cat.* 2999.

WESTERN HIMALAYA; Garwhal to Nipal, alt. 2–5000 ft.

Branches stout, grooved. *Leaves* 4–14 by 1½–4 in., narrowed at both ends, coriaceous, glabrous above; petiole very short. *Corymbs* 4–8 in. diam., rounded, sessile; peduncles densely tomentose, bracteolate. *Heads* ¾–1 in.; invol. bracts about 10, nearly flat; corolla ½ in. *Achenes* ⅙–¼ in., slender, densely silky; pappus ½ in., hairs often contracted at the base.

2. **L. decora,** *Kurz in Journ. As. Soc.* 1872, ii. 317; 1877, ii. 204; *For. Fl.* ii. 78; leaves elliptic or elliptic-lanceolate glabrous on both surfaces, invol. bracts very many woolly, outer very short-imbricating along the whole peduncle, pappus reddish. *Clarke Comp. Ind.* 245.

PEGU; dry forests of Prome, *Kurz*.

A small tree, leafless in the hot season; shoots tomentose. *Leaves* 5–7 in., base unequal; petiole ½–1 in. *Corymbs* rounded, almost capitate, the heads very nearly sessile from the invol. bracts passing into the bracteoles of the peduncle; inner bracts as in *L. spectabilis*, but woolly at the base; corolla nearly 1 in., fragrant. *Achenes* ½ in. (Kurz), pappus as long.

98. DICOMA, *Cass.*

Herbs or low shrubs. *Leaves* alternate. *Heads* subsessile on the branches, rarely corymbose, white or purple, homogamous, discoid; fl. all ☿, or heterogamous with the outer fl. ♀ and all fertile, or the innermost sterile, tubular, limb 5-partite, segments erect or revolute, ♀ if present slender with a short ligule. *Invol. bracts* ∞-seriate, ovate-lanceolate or linear, acuminate or spinescent, outer shorter; receptacle flat, naked, often pitted. *Anther-bases* sagittate, tails long, bearded. *Style-arms* short, erect, obtuse. *Achenes* turbinate, densely silkily villous, 5–10-ribbed; pappus hairs ∞-seriate, inner or all flat, scabrid bearded or feathery; outer shorter, paleaceous or of slender bristles.—DISTRIB. Species 13, tropical and S. African and Indian.

1. **D. tomentosa,** *Cass.*; *DC. Prodr.* vii. 36; erect, branched, clothed with white cottony wool, leaves sessile linear or linear-obovate obtuse or acute quite entire, heads subaxillary, invol. bracts ½–⅔ in. subulate spinescent straight glabrous shining, outer pappus bristles slender, inner narrowly subulate-lanceolate strongly ribbed, margins undulate. *Clarke Comp. Ind.* 245. D. lanuginosa, *DC. in Wight Contrib.* 26; *Prodr.* vii. 36; *Wight Ic.* t. 1140; *Dalz. & Gibs. Bomb. Fl.* 132. Xeropappus lanuginosus, *Wall. Cat.* 2980. Acilepis lanata, *Spreng. mss.* Onopordon lanatum, *Herb. Madr.*

NORTH WEST INDIA, *Royle*; Dhaulpoor, *Jameson*. AVA, *Wallich*. SCIND, *Stocks*. WESTERN PENINSULA; from the Concan southwards, in gravelly places.—DISTRIB. Tropical Africa.

Annual, 10–18 in. high, much branched; branches terete. *Leaves* 1–3 in., usually narrow, glabrate or cottony above, nerves obscure. *Heads* glabrous; spines of invol. bracts yellowish, shining; corolla ¼ in. *Achenes* broad and short, ⅛ in. long, turbinate, densely silky; pappus shining, elastic; inner membranous and hyaline with a rigid midrib, pale brown, ¼ in. long.

99. HOCHSTETTERIA, *DC.*

A rigid branched perennial herb. *Leaves* alternate. *Heads* solitary, terminal, homogamous, discoid, yellow; fl. all ☿, similar and fertile, tubular, limb elongate 5-partite, segments revolute. *Involucre* subhemispheric; bracts ∞-seriate, subulate, outermost few foliaceous; receptacle convex, pitted, margins

of pits often shortly paleaceous. *Anther-bases* sagittate, tails long, lanceolate. *Style-arms* linear, obtuse. *Achenes* turbinate, villous; pappus of 10 stellately spreading slender pales, margins below hyaline, above slender and barbellate.

1. **H. Schimperi,** *DC. Coll. Mem.* ix. t. 6; *Prodr.* vii. 287; *Boiss. Fl. Orient.* iii. 219; *Clarke Comp. Ind.* 246.

SCIND, *Dalzell.*—DISTRIB. Arabia, Nubia.

Nearly glabrous, 1–2 ft.; branches slender, erect or ascending, nearly smooth, furrowed. *Leaves* shortly petioled, ovate or elliptic, acute, serrulate; nerves very slender. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., involucrate by 1–2 small leaves; invol. bracts straight, very rigid, 1-nerved; corolla $\frac{1}{4}$ in. *Achenes* $\frac{1}{16}$ in., turbinate, covered with long brown silky hairs; pappus pales narrowly subulate-lanceolate, incurved, membranous, hyaline, undulate with a strong midrib.

100. AINSLIÆA, *DC.*

Subscapigerous, erect, perennial, simple or branched herbs. *Leaves* alternate, chiefly radical. *Heads* small, sessile or peduncled, solitary fascicled racemed panicled or spicate, on a single strict slender flowering stem, often pendulous, homogamous, discoid, white or purplish, 1–4-fld; fl. ☿, all fertile, slender; limb not dilated, unequally 5-partite. *Involucre* narrow; bracts ∞-seriate, laxly imbricate, rigid, inner elongate, outer shorter. *Anther-bases* sagittate; tails long, bearded. *Style-arms* narrowly cuneate, tips spreading rounded. *Achenes* oblanceolate, subcompressed, ribs 0 or 5–10, hairy; pappus bristles 1-seriate, feathery.—DISTRIB. Species 10, Himalayan, Chinese, and Japanese.

1. **A. pteropoda,** *DC. Prodr.* vii. 14; more or less tomentose cottony or hairy, leaves ovate or cordate acute or acuminate suddenly narrowed into a broadly winged petiole, heads in tall strict spikes or lax elongate panicled racemes, achenes 10-ribbed. *Clarke Comp. Ind.* 246. A. silhetensis, *Clarke in Journ. Linn. Soc.* xiv. 411; *Kurz in Journ. As. Soc.* 1877, ii. 205. Vernonia lobelioides, *Wall. Cat.* 2927. Liatris lobelioides, *Wall. mss.* Perdicium triflorum, *Ham. mss.* Prenanthes ? Candolleana, *Wall. Cat.* 3280, *in part.*

TEMPERATE HIMALAYA: from Simla to Bhotan and the Mishmi hills, alt. 5–8000 ft. KHASIA MTS., alt. 5–7000 ft. MARTABAN and TENASSERIM, *Kurz*; top of Moolee, alt. 7000 ft., *Parish.*

Leaves 2–5 by $1\frac{1}{2}$–3 in., membranous or rather thick, sparsely hairy glabrate or white-tomentose beneath, obscurely crenate; petiole as long as the blade. *Flowering stem* 1–3 ft., with few small lanceolate leaves, cobwebby cottony or glabrous, rarely branched or forked at the base; heads $\frac{1}{3}$ in. long, solitary or fascicled on the stem or on alternate short spreading lateral branches, 3-fld.; invol. bracts lanceolate. *Achenes* $\frac{1}{5}$ in., oblanceolate, softly silky; pappus $\frac{1}{5}$ in., pale brown.

2. **A. angustifolia,** *Hook. f. & Thoms. mss.*; sparsely hairy, leaves oblanceolate acute narrowed into a long petiole obscurely toothed, cauline sessile, heads racemed on the short branches of a long slender panicle, achenes obscurely ribbed. *Clarke in Journ. Linn. Soc.* xiv. 412; *Comp. Ind.* 247. A. glumacea, *Klatt in Sitzungsb. Münch. Akad.* 1878, 97. Prenanthes ? Candolleana, *Wall. Cat.* 3280, *in part.*

KHASIA MTS., alt. 3–5000 ft., *De Silva,* &c.

A smaller and more delicate plant than *A. pteropoda,* with narrower leaves, never abruptly narrowed nor tomentose beneath; heads much smaller, $\frac{1}{4}$–$\frac{1}{3}$ in. long; peduncles and pedicels very slender; achenes $\frac{1}{6}$ in., silky; pappus as long, brown.

3. **A. aptera,** *DC. Prodr.* vii. 14; villous pubescent or glabrate, leaves long-petioled triangular- or orbicular-cordate acute sinuate-lobed or -toothed,

heads in interrupted spikes or spreading branched panicles, achenes obscurely ribbed. *Clarke Comp. Ind.* 247.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 5-8000 ft., ascending to 10,000 in Sikkim. KHASIA MTS., alt. 4-5000 ft, *J. D. H. & T. T.*

Usually a more robust plant than either of the preceding. *Leaves* sometimes 7 in. long and broad, glabrous villous or densely silkily villous; petiole 3–7 in., glabrous or villous. *Flowering stem* 1–3 ft., generally stout and red-brown. *Heads* $\frac{1}{2}$–$\frac{3}{4}$ in. long, subsessile or on strict stiff slender peduncles, usually glabrous; bracts sometimes numerous, the outer small and imbricating along the peduncle; corolla $\frac{1}{3}$ in. *Achenes* $\frac{1}{4}$ in, like those of *A. pteropoda*, but less distinctly ribbed; pappus as long, brown.—Very variable in the number, length and breadth of the invol. bracts.

4. **A. Brandisiana,** *Kurz in Journ. As. Soc.* 1872, ii. 318; 1877, ii. 205; more or less hirsute, leaves petioled oblong acute quite entire base cordate margins villously fringed, heads in open branched panicles. *Clarke Comp. Ind.* 247.

LOWER BIRMA; Karen hills, alt. 2–4000 ft., *Kurz.*

Leaves $2\frac{1}{2}$–$4\frac{1}{2}$ by 1–2 in., sparsely pubescent or glabrous above, sparsely hirsute beneath, densely so along the margins with curled hairs, base shortly cordate with rounded lobes and a very close sinus; petiole 1–2 in., stout, hirsute. *Flowering stems* 12–18 in., pubescent or scabrid; heads long-peduncled, $\frac{1}{2}$–$\frac{3}{4}$ in. long; corolla $\frac{1}{3}$ in. *Achenes* unripe, silky.

101. **CATAMIXIS,** *Thoms.*

An erect undershrub. *Leaves* alternate, petioled, obovate or oblong, obtusely serrate. *Heads* small, narrow, in a broad terminal corymb, yellow ?, homogamous, few-fld.; fl. all ☿, similar, ligulate and fertile. *Involucre* oblong; bracts few, ∞-seriate, lanceolate, acute, outer shorter; receptacle small, naked. *Anther-bases* sagittate, tails elongate barbellate. *Style* filiform, obtuse; arms very short, erect. *Achenes* narrowly turbinate, silkily villous; pappus hairs sub-2-seriate, slender, scabrid, outer shorter.

1. **C. baccharoides,** *Thoms. in Journ. Linn. Soc.* ix. 343, t. 4; *Clarke Comp. Ind.* 248.

WESTERN HIMALAYA; Garwhal, on the Sewalik hills, *Royle.*

Branches subsilkily pubescent. *Leaves* 2–3 by 1–$1\frac{1}{2}$ in., coriaceous, narrowed into the short petiole, $\frac{1}{2}$-amplexicaul, glabrous; nerves prominent on both surfaces when dry. *Corymbs* dichotomously branched; branches slender, puberulous, suberect; heads $\frac{1}{3}$ in. long; ligules spreading; involucre much shorter than the flowers; corolla $\frac{1}{5}$ in. *Achenes* $\frac{1}{12}$ in. long; pappus $\frac{1}{3}$ in., white.

102. **GERBERA,** *Gronov.*

Scapigerous herbs. *Leaves* radical. *Scape* naked or scaly. *Heads* solitary, heterogamous, radiate, rarely homogamous and discoid, yellow pink or white; ray-fl., if present, 1–2-seriate, ♀ and fertile; disk-fl. ☿, fertile; both 2-lipped, outer lip of ray-fl. with a 3-toothed ligule, inner 2-partite; tips of disk-fl. more equal, outer 3–4-fid, inner entire or 2-partite. *Involucre* turbinate or broadly campanulate; bracts 2–∞-seriate, narrow, acute, outer shorter; receptacle flat. *Anther-bases* sagittate, tails long. *Style-arms* of ☿ linear, obtuse. *Achenes* compressed, 5-ribbed, papillose, tip contracted or beaked; pappus copious, hairs slender, smooth or scabrid. —DISTRIB. About 20 species, African and Asiatic, temperate or mountain.

* *Heads rayed.*

1. **G. piloselloides,** *Cass.*; *DC. Prodr.* vii. 16; leaves shortly petioled elliptic or obovate-oblong obtuse quite entire villously hirsute beneath, scape

villous ebracteate, heads rayed, invol. bracts cottony, achenes long with a long slender beak scaly, pappus red. Oreoseris ovalifolia, *Wall. Cat.* 2930. G. ovalifolia, *DC. l. c.* 17; *Clarke Comp. Ind.* 249. Arnica piloselloides, *Linn. Amœn. Acad.* vi. 103.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 7000 ft., *J. D. H.* KHASIA MTS., alt. 5000 ft., *Griffith*, &c. LOWER BIRMA; Karen hills, *Mason*.—DISTRIB. China, S. Africa.

Crown and young leaves densely woolly. *Leaves* 2–5 by 1–2 in., narrowed into the stout short petiole, glabrous or sparsely hairy above, usually white beneath. *Scape* 12–20 in., stout. *Head* 1–1½ in. diam.; invol. bracts linear-lanceolate, suberect; ligules ½ in. long. *Achenes* ⅓ in., very slender; pappus about as long.

2. **G. lanuginosa,** *Benth. in Gen. Pl.* ii. 497; leaves obovate or oblanceolate acute or acuminate lobulate towards the base or lyrate-pinnatifid or petiole auricled rarely entire glabrous and shining above densely cottony beneath, scape cottony ebracteate, heads rayed, invol. bracts cottony, achenes slender hardly beaked subpapillose, pappus white. *Clarke Comp. Ind.* 249, *excl. syn. O. pusilla.* Oreoseris lanuginosa, *DC. Prodr.* vii. 17; *Deless. Ic. Sel.* iv. t. 76. Oreoseris lanuginosa, *Wall. Cat.* 2929 A. C. Chaptalia gossypina, *Royle Ill.* 251, t. 59, f. 2.

WESTERN HIMALAYA; from Murree, *Fleming*, to Kumaon, alt. 4–8000 ft.

Crown and young leaves silkily woolly. *Leaves* 2–5 by ¾–1½ in. (exceptionally 7–10 by 3–3½ in.), petiole long or short, usually sinuately-pinnatifid at the base only, lobes rounded, rarely entire or pinnatifidly lobed throughout. *Scape* 4–12 in., cottony, slender. *Head* 1–2½ in., cottony; outer invol. bracts ovate; inner linear-lanceolate, acuminate, suberect; ligules ½ in. long. *Achenes* ¼ in., ribbed; pappus ¾ in.

VAR. *pusilla*; leaves ½–1 in., terminal lobe rounded or ovate obtuse or acute, scape ½–6 in., heads ½ in. diam. Oreoseris pusilla, *DC. Prodr.* vii. 17. O. lanuginosa, *Wall. Cat.* 2929 B.—Nipal, *Wallich*; Kumaon and Garwhal, *Jamieson*, *Thomson*. This has all the appearance of being a starved state of *G. lanuginosa.*

3. **G. nivea,** *Benth. in Gen. Pl.* ii. 497; leaves obovate or obovate-spathulate tip rounded pinnatifidly lobed throughout their length, lobes rounded obscurely toothed, sinus acute or obtuse glabrous above densely cottony beneath, scape cottony ebracteate, invol. bracts ovate-lanceolate long-acuminate cottony, inner large and broad, achenes not seen. Oreoseris ? nivea, *DC. Prodr.* vii. 17. Senecio niveus, *Wall. Cat.* 3143. Arnica nivea, *Wall. l. c.*

NIPAL, *Wallich.*

Leaves petioled, 2–3½ by 1–1½, gradually narrowed from the rounded tip downwards to the short petiole, coriaceous, glabrous above. *Scape* very slender, cottony, longer than the leaves. *Heads* drooping, 1¼ in. diam.; invol. bracts with long points, glabrate. *Flowers* too young for examination.

4. **G. Kunzeana,** *Braun & Aschers. in App. Plant. nov. ad Cat. Sem. Hort. Berol.* 1871, 3; diœcious, leaves oblong or ovate acute or mucronate subentire or margins lobulate or lyrate-pinnatifid or petiole winged glabrous above densely cottony beneath, lobes apiculate, scape glabrous or cottony above with scattered filiform bracts, invol. bracts glabrous membranous outer ovate, inner broadly lanceolate acuminate, achenes slender hardly beaked scabrid ribbed, pappus chestnut-brown. G. nivea, *Clarke Comp. Ind.* 249. Cleistanthium nepalense, *Kunze in Bot. Zeit.* 1851, 350.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 7–12,000 ft.

Similar in habit and foliage to *G. lanuginosa*, but with different invol. bracts and pappus, and at once distinguished from it and all others of the genus by the filiform bracts on the scape. It is most closely allied to the Chinese *G. anandria*, Schultz-Bip. mss. (*Anandria Bellidiastrum*, DC.), which differs in the cottony obtuse invol.

bracts, quite glabrous achenes, and pale pappus. Clarke observes that the female plant produces strictly cleistanthous heads with minute filiform corollas on shorter later peduncles. Not distinguished by Bentham (*Gen. Pl.* ii. 498) from Wallich's *Arnica nivea*, which is *G. nivea*, Benth.

** *Ligules* 0.

5. **G. macrophylla,** *Benth. in Gen. Plant.* ii. 497; leaves large long-petioled sagittate abruptly acuminate denticulate appressedly cottony (rarely glabrous) beneath sometimes pinnatifid at the base, scape cottony ebracteate, invol. bracts acute glabrous, outer ovate, inner linear-lanceolate, achenes slender beaked almost glabrous, pappus white. *Clarke Comp. Ind.* 250. Chaptalia maxima, *Don Prodr.* 166. Bernieria nepalensis, *DC. Prodr.* vii. 18; *Deless. Ic. Sel.* iv. t. 77. Tussilago macrophylla, *Wall. Cat.* 2989. Perdicium semifloscu-lare, *Ham. mss. in Don Prodr.*

Temperate Himalaya; from Garwhal to Bhotan, alt. 6–7000 ft. (to 10,000, Clarke). Khasia Mts.; alt. 4–6000 ft.

Crown of rootstock and young leaves woolly. *Leaves* 5–12 by $2\frac{1}{2}$–7 in.; base truncate or cordate, angles acute obtuse or rounded, when pinnatifid lobes irregular, rarely more than 1 or 2 pairs, oblong, reaching as far as the margin of the terminal lobe, horizontal or deflexed, sometimes remote from the blade; petiole 3–12 in., cottony. *Scape* 6–18 in. *Heads* 1–$1\frac{1}{2}$ in. diam.; invol. bracts pale or coloured; corolla $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Achenes* $\frac{1}{3}$–$\frac{1}{2}$ in., obscurely puberulous, strongly ribbed; pappus dirty-white or reddish, nearly $\frac{2}{3}$ in. long.

Var. *glabrata*; leaves glabrous beneath.—Sikkim and Khasia.

Tribe XI.—CICHORIACEÆ.

103. CICHORIUM, *Linn.*

Erect, glabrous or hispid herbs with divaricate sometimes spinescent branches. *Leaves*, upper subentire, lower pinnatifid. *Heads* sessile on the branches or on thickened peduncles, homogamous, blue; fl. all ligulate. *Invol. bracts*, inner 1-seriate, at length concave at the base with the outer flowers in the concavity, outer few shorter; receptacle flat, naked or subfimbrillate. *Achenes* glabrous, sub-5-angled, or the outer subcompressed and ∞-ribbed or striate, base contracted, tip truncate or the margin slightly produced; pappus pales short, 2–3-seriate.—Distrib. Species 3; temperate regions of the old world.

1. **C. Intybus,** *Linn.*; *Boiss. Fl. Orient.* iii. 715; perennial, stem and leaf-nerves beneath hispid, leaves runcinate, heads solitary and terminal and axillary clustered, invol. bracts glandular-hispid much shorter than the corolla, pappus pale obtuse very short. *DC. Prodr.* vii. 84; *Clarke Comp. Ind.* 250. C. Cosnia, *Ham in Wall. Cat.* 3241.

North Western India; Kumaon (cult. or an escape?).—Distrib. Westward to the Atlantic.

Root fleshy, tapering. *Stem* 1–3 ft., angled and grooved; branches rigid, spreading. *Leaves* oblong-lanceolate, upper cordate-amplexicaul. *Heads* 1–$1\frac{1}{2}$ in. diam., peduncle thickened in the middle; invol. bracts herbaceous; ligules bright blue, rarely white or pink, truncate, 5-toothed. *Achenes* angled, pale, mottled.—The specimens are very indifferent and include some of the cultivated variety *C. Endivia* (the garden Endive), which is more glabrous.

104. LAPSANA, *Linn.*

Erect herbs. *Leaves* alternate, toothed or the lower pinnatifid. *Heads* small, loosely corymbose or panicled, yellow, homogamous; fl. all ligulate.

Involucre cylindric-campanulate; inner bracts subequal, herbaceous, fruiting harder and more convex or keeled, erect, outer few small; receptacle flat, naked. *Achenes* oblanceolate, curved subterete, 20-30-ribbed, ribs slender, base narrowed, top rounded; pappus 0.—DISTRIB. Species 3-4, European and Asiatic.

1. **L. communis,** *Linn.*; *Boiss. Fl. Orient.* iii. 720; annual, glabrous or hispid below, stem paniculately branched leafy, lower leaves petioled lyrate, cauline ovate uppermost linear entire, heads corymbose $\frac{1}{3}$ in. long glabrous, *DC. Prodr.* vii. 76; *Reichb. Ic. Fl. Germ.* xix. t. 1352; *Clarke Comp. Ind.* 250.

KASHMIR; alt. 5-6000 ft.—DISTRIB. N. & W. Asia, Europe, N. Africa.

Stem 1-2 ft. *Leaves* membranous, terminal lobe of radical sinuate-toothed, lateral small. *Heads* many; peduncle short, slender, naked; invol. bracts 8-10, linear, rigid, keeled, obtuse, glabrous or glandular. *Achenes* $\frac{1}{8}$ in., pale, shining.

105. KŒLPINIA, *Pall.*

A glabrous or puberulous weak annual. *Leaves* chiefly radical, linear, quite entire. *Heads* small, peduncled, yellow, homogamous; fl. all ligulate. *Involucre* cylindric; bracts 5-7, narrow, subequal, thin, base at length keeled, outer very few, small; receptacle naked. *Achenes* very long, much exceeding the bracts, spreading and incurved, narrowly linear, ribbed, dorsal ribs with rows of glochidiate spines.

1. **K. linearis,** *Pall.*; *Boiss. Fl. Orient.* iii. 721; *DC. Prodr.* vii. 78; *Jaub. & Spach. Ill. Pl. Orient.* t. 286; *Clarke Comp. Ind.* 721. Rhagadiolus Kœlpinia, *Willd.* Lapsana Kœlpinia, *Linn.*

The PUNJAB, KASHMIR and WESTERN TIBET; alt. 2-14,000 ft., *Jacquemont*, &c.—DISTRIB. Central and Western Asia, N. Africa, S. Russia.

Root slender. *Stem* 6-12 in., erect or decumbent, simple or branched, leafy. *Leaves* 2-6 by $\frac{1}{10}$-$\frac{1}{4}$ in., gradually narrowed at both ends. *Heads* $\frac{1}{4}$-$\frac{1}{3}$ in. *Achenes* $\frac{1}{3}$-$\frac{2}{3}$ in., incurved like birds' claws, puberulous, terminal spines stellate.—In some Affghan specimens the dorsal spines are almost suppressed.

106. RHAGADIOLUS, *Juss.*

Annual. *Leaves* toothed or pinnatifid. *Heads* small, axillary in the forks or terminal, yellow, homogamous, fl. all ligulate. *Involucre* subcampanulate; bracts 1-seriate, at length keeled and embracing the outer achenes; receptacle naked. *Achenes* very long, much exceeding the bracts, incurved, narrow, smooth, beaked, outer with a short pappus, inner with a paleaceous pappus.—DISTRIB. Species 5, Mediterranean and Oriental.

1. **R. Hedypnois,** *Fisch & Mey. Ind.* iv. *Sem. Hort. Petrop.* 48; glabrous or sparsely hispid, diffuse, leaves obovate-oblong, stem and peduncles thickened in fruit, achenes glabrous. *DC. Prodr.* vii. 78. Gastradiolus Hedypnois *and* angulosus, *Jaub. & Spach Ill. Pl. Orient.* iii. t. 264, 265; *Boiss. Fl. Orient.* iii. 723.

KASHMIR, *Falconer*.—DISTRIB. Westwards to Asia Minor.

Branches 2-8 in., all spreading from the root. *Leaves* 1-3 in., narrowed into the petiole. *Heads* $\frac{1}{4}$-$\frac{1}{3}$ in.; invol. bracts small, subspinulose or smooth in fruit. *Achenes* $\frac{1}{4}$-$\frac{1}{2}$ in., narrowed from the base to the incurved tip, terete, smooth.

107. PICRIS, *Linn.*

Erect, branched, hispid herbs. *Leaves* alternate or radical, entire toothed or pinnatifid. *Heads* terminal, long-peduncled, homogamous, yellow; fl. all ligu-

late. *Involucre* suburceolate or campanulate; inner bracts 1-seriate, subequal; outer ∞-seriate, herbaceous, narrow, or the outermost broad and foliaceous; receptacle flat. *Anther-bases* sagittate, acute or shortly setaceous. *Style-arms* slender. *Achenes* narrow, incurved, subterete compressed or angled, glabrous, 5–10-ribbed, ribs transversely rugose, beak short or long, all similar or the outer with a shorter beak and no pappus; pappus copious, of 1 series of soft feathery hairs, or of fewer rigid hairs dilated at the base, with sometimes a few outer short hairs.—DISTRIB. Species about 24, Europe, N. Africa, N. Asia and one cosmopolitan.

P. hieracioides, *Linn.*; *Boiss. Fl. Orient.* iii. 734; tall, corymbosely branched, radical leaves sinuate-toothed, cauline cordate ½-amplexicaul, peduncles not thickened in fruit, achenes narrowly ellipsoid shortly beaked compressed, all with feathery deciduous pappus. *DC. Prodr.* vii. 128; *Clarke Comp. Ind.* 251. P. hieracioides, *var.* indica, *Wight Ic.* t. 1143. P. hamulosa, *Wall. Cat.* 3255; *DC. l. c.* 129. P. strigosa, *Wall. Cat.* 3256.

TEMPERATE HIMALAYA; from Murree to Bhotan, alt. 6–8000 ft., ascending to 10,000 ft. in Sikkim. KHASIA MTS.; alt. 4–6000 ft. NILGHERRY MTS.; alt. 5–8000 ft.—DISTRIB. N. Asia to Japan, W. Asia, Europe, N. Africa.

A coarse herb, 1–4 ft.; hairs straight or hooked. *Leaves* 2–5 in. *Heads* ½–⅔ in. long; invol. bracts glabrous or hispid. *Achenes* ⅙ in., narrowed at both ends, slightly curved, brown; pappus very white, ¼ in.

108. CREPIS, *Linn.*

Annual or perennial glabrous or hairy herbs, hairs never stellate. *Leaves* radical or alternate, cauline often stem-clasping, entire toothed or pinnatifid. *Heads* peduncled, solitary fascicled or corymbose, yellow or red, homogamous; fl. all ligulate. *Involucre* cylindric or campanulate; invol. bracts either ∞-seriate and regularly imbricate, or the outer small or very much shorter than the linear 1-seriate inner; base or midrib thickened after flowering or not; receptacle flat, rarely concave, naked or shortly fimbrillate. *Achenes* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10–20-ribbed, tip narrowed or beaked; pappus short or long, usually copious, hairs usually silvery, simple and soft, rarely brownish and stiff or brittle.—DISTRIB. Species 130, chiefly in N. temp. region of the old world, none in S. temperate.

It is impossible to draw a line between this genus and *Lactuca, Hieracium, Launæa* or even *Prenanthes*. As a rule the Indian species here included have terete or only slightly compressed achenes, narrowed from above the middle to the tip in all but the last section; and they are truly beaked in section *Barkhausia* alone.

SECT. I. **Barkhausia.** Inner or all the *achenes* with long slender beaks; pappus soft.

1. **C. fœtida,** *Linn.*; *Boiss. Fl. Orient.* iii. 851; hispid, lower leaves lyrate-pinnatifid or sinuate-toothed, cauline cordate base ½-amplexicaul, heads drooping in bud, invol. bracts hispid and glandular, outer hardened and keeled at the base, outer achenes shorter than the bracts acute, inner long-beaked scabrid striate. *Clarke Comp. Ind.* 252. C. Kotschyana, *Clarke l. c. not of Boissier.* Barkhausia fœtida, *DC. Prodr.* vii. 158.

The PUNJAB and WESTERN HIMALAYA; from Kashmir to Kumaon, in fields, alt. 6–8000 ft.—DISTRIB. Westward to the Atlantic.

Annual; branches suberect or spreading from the root, 6–18 in., stout, corymbosely branched. *Leaves* 2–6 in. *Heads*, flowering ½ in., fruiting ¾ in, and as broad; invol. bracts hispid. *Outer achenes* ¼ in., curved, pale, dorsally thickened; inner ⅓–½ in.;

straight, many-ribbed, red-brown, beak very slender as long as the body; pappus ¼ in., dirty-white.

SECT. II. **Soyeria.** Perennials. *Heads* large, broad, usually hirsute; invol. bracts imbricating, all long or outer broad or narrow, gradually passing into the inner. *Achenes* long, narrowed gradually upwards or to both ends; pappus soft, white.

2. **C. sibirica,** *Linn.*; *Ledeb. Fl. Ross.* ii. 828; stout, erect, more or less hispid, radical and lower leaves oblanceolate acuminate sinuate-toothed or lyrate-pinnatifid, lobes rounded denticulate, cauline cordate ½-amplexicaul, heads 1 in. diam. few subcorymbose peduncled, invol. bracts obtuse ciliate and pubescent, outer broadly ovate, inner linear, achenes ½ in. slender ribbed smooth gradually narrowed upwards, pappus short. *DC. Prodr.* vii. 167; *Reichb. Ic. Fl. Germ.* t. 1458. *Clarke Comp Ind.* 252. Hieracium sibiricum, *Gmel.* Soyeria sibirica, *Monnier Hieracium,* 177.

WESTERN HIMALAYA; from Kashmir to Kumaon, *Falconer*, &c., alt. 6–10,000.—DISTRIB. Siberia, S. Europe to Austria.

Root fusiform, very stout. *Stem* 6–18 in., simple or sparingly branched. *Leaves* 6–12 in., lowest petioled, scaberulous or glabrate above. *Achenes* pale brown, quite smooth; pappus ¼ in., rather scanty, hairs singly deciduous.—I have not quoted Boissier who (iii. 833) describes the achenes as 20–30-ribbed, the ribs transversely rugulose and scaberulous.

3. **C. blattarioides,** *Vill.*; *DC. Prodr.* vii. 167; hispid, villous and glandular above, stem simple subcorymbosely branched above, leaves entire or sinuate-toothed radical obovate-oblong petioled, cauline few large sessile, heads 1 in. diam. few erect, peduncles long strict naked, invol. bracts 2–3-seriate all long lanceolate acute villous, achenes ⅓ in. slender narrowed at both ends ribbed smooth longer than the white shining pappus. *Reichb. Ic. Fl. Germ.* t. 1461. C. austriaca, *Jacq. Fl. Aust.* v. t. 441. Hieracium blattarioides, *Linn.* Soyeria blattarioides, *Monnier Tarax.* 76.

KASHMIR; Sonamurg, alt. 11,500 ft., *Clarke.*—DISTRIB. Mid. & West Europe.

Stem 1–2 ft., rather stout. *Leaves*, radical, 2–4 by 1–2 in., cauline as broad or broader. *Heads* 4–8, rarely more; peduncle swollen at the base; invol. bracts 20–30, ½ in. long, blackish when dry, acuminate, with rarely a slender shorter basal one. *Achenes* red-brown, outer curved, ribs strong; pappus ¼ in. long, rather persistent.

SECT. III. **Youngia.** *Heads* small, narrow; outer invol. bracts very short, inner linear 1-seriate. *Achenes* small, narrowed at both ends, slightly flattened, ribbed, hardly beaked; pappus soft white or grey.

* *Stems or flowering branches much dichotomously branched, slender, virgate.*

4. **C. glauca,** *Benth. in Gen. Pl.* ii. 515; annual, quite glabrous, stems very numerous from the root dichotomously divaricatingly excessively branched, radical leaves long-petioled obovate-spathulate sinuate-toothed pinnatifid or pinnate, lobes variously acutely cut, cauline sessile linear entire, heads ⅓–½ in. narrow, outer invol. bracts minute inner 6–8 linear glabrous, achenes very slender ribbed to the tip longer than the white pappus. C. flexuosa, *Clarke Comp. Ind.* 254 (*not of Ledeb.*). Barkhausia flexuosa, *DC. Prodr.* vii. 155. Youngia glauca, *Edgew. in Trans. Linn. Soc.* xx. 79.

WESTERN TIBET, and the Tibetan regions of Lahul and Kumaon, alt. 8–17,000 ft., *Falconer*, &c.

A most densely corymbosely branched herb, forming an obconical mass 6–12 in. high, and as broad at the truncate top, of forking spreading rigid slender branches

terminated by small yellow heads. *Leaves* few, radical soon disappearing. *Heads* terminal and sublateral, few fld.; peduncles naked, slender. *Achenes* $\frac{1}{5}$ in. long, very slender, pale, obscurely scabrid, hardly beaked; pappus white.—Bentham suggests that this and *Youngia flexuosa* of the Altai are varieties; Clarke also points out they are altogether similar, except in that the Altai plant has a distinct beak to the achenes.

5. **C. tenuifolia,** *Willd. Sp. Pl.* iii. 1605; perennial, quite glabrous, stems very many from the root-stock stout much branched stiff, radical leaves long-petioled pinnatifid, lobes distant spreading very unequal slender acuminate sparingly toothed or entire, rachis winged, heads corymbose $\frac{1}{2}$ in. long, invol. bracts hoary outer very small inner linear subacute, tips often clawed, achenes narrowly fusiform shortly beaked compressed ribbed minutely scabrid about equalling the soft silvery pappus. *Clarke Comp. Ind.* 254. Barkhausia tenuifolia, *DC. Prodr.* vii. 155. Youngia diversifolia, *Ledeb. Fl. Ross.* ii. 837. Prenanthes diversifolia, *Ledeb. Ic. Fl. Alt.* t. 152. Lagoseris tenuifolia, *Reichb. Ic. Crit.* i. t. x.

NORTHERN KASHMIR and WESTERN TIBET; alt. 12–15,000 ft., *Falconer*, &c.—DISTRIB. Dahuria, Siberia, Mongolia.

Root woody. *Stem* often branching from the base, 6–18 in. high, stiff. *Leaves* 4–8 in., narrow, radical rarely linear and entire, cauline usually so. *Heads* numerous; peduncles bracteate, sometimes sparsely pubescent. *Achenes* $\frac{1}{5}$ in., red-brown, slightly compressed; pappus-hairs rather deciduous.

6. **C. japonica,** *Benth. Fl. Hongk.* 194; annual, glabrous or puberulous, radical leaves obovate sinuate-toothed or runcinate-pinnatifid, flowering-stems slender erect nearly naked, heads $\frac{1}{6}$–$\frac{1}{4}$ in. on slender bracteolate peduncles, invol. bracts 6–8 narrowly oblong glabrous fruiting with a strong basal midrib, achenes narrowly fusiform hardly beaked compressed ribbed equalling or shorter than the white soft pappus. C. lyrata, *Clarke Comp. Ind.* 253. Youngia lyrata, *Cass.*; *Thw. Enum.* 168. Y. Thunbergiana, runcinata, napifolia, Poosia, ambigua, fastigiata *and* striata, *DC. Prodr.* vii. 192, 193. Y. napifolia, *Wight Ic.* t. 1147. Lactuca napifolia, *DC. in Wight Contrib.* 27. Chondrilla runcinata, *Wall. Cat.* 3272. Prenanthes Poosia *and* napifolia, *Wall. Cat.* 3265, 3277. P. japonica, *Linn. Mant.* 107. P. striata, *Bl. Bijd.* 885.

Throughout INDIA and CEYLON; ascending to 10,000 ft., in the Himalaya.—DISTRIB. Malay Peninsula, China, Japan, Affghanistan, Mauritius.

Leaves rosulate, 2–6 in., membranous. *Flowering stems* 1 or many from the root, 6–18 in., soft, strict, corymbosely branched at the top; branches slender, spreading. *Invol. bracts* with hyaline margins, erect green. *Achenes* $\frac{1}{12}$ in., distinctly contracted but not beaked at the top, many-ribbed, ribs smooth, red-brown.—Wight suggests that this should be placed in the *Brachyramphus* section of *Lactuca*, and Clarke says that the subgenus *Youngia* would be better placed under *Lactuca*. The fact is that it will go with either *Crepis* or *Lactuca*, but has rather the habit of the former according to Bentham's and my view of the limitation of these very artificial genera.

7. **C. fuscipappa,** *Benth. in Gen. Pl.* ii. 574; annual, glabrous or nearly so, stem erect slender simple or sparingly forked, radical leaves petioled elongate obovate or oblanceolate obtuse acute or acuminate sinuate-lobed or pinnatifid, cauline linear or lanceolate base narrow, heads few corymbose $\frac{1}{3}$ in. long, peduncles slender naked, outer invol. bracts very small, inner linear subacute glabrous fruiting not ribbed at the base, achenes narrowly fusiform hardly beaked compressed ribbed minutely scabrid about equalling the soft grey pappus. *Clarke Comp. Ind.* 254. C. gracilis, *Hook. f. & T. mss.*; *Clarke Comp. Ind.* 254. C. primulifolia, *Herb. Ind. Or. H. f. & T.* Youngia fuscipappa, *Thwaites Enum.* 168.

SIKKIM HIMALAYA; Lachen, alt. 9–10,000 ft., *J. D. H.* KHASIA MTS.; alt. 4–5000 ft., *Wallich*, &c. CEYLON; central province, alt. 5000 ft., *Walker*, &c.

Radical leaves 5–10 by ½–1½ in., cauline in Khasian and Sikkim specimens 2–3 in., petioled or narrowed at the base. *Stem* 1–3 ft., very slender, rarely divided. *Heads* few and small for the size of the plant. *Achenes* ⅙ in., red-brown. I find no material difference between the achenes of this and *L. japonica* which would warrant separating them generically; the name *fuscipappa* is hardly merited, the pappus being not at all brown, but of an inky grey or nearly white.

8. **C. acaulis,** *Hook. f.*; perennial, dwarf, quite glabrous, radical leaves very narrowly obovate-spathulate linear or lanceolate obtuse or acute quite entire or sinuate-toothed or subpinnatifid, flowering stem shorter or longer than the leaves, heads few 1 in. long 10–12-fld., peduncle bracteolate, outer invol. bracts very small, inner linear, achenes ellipsoid narrowed at both ends subcompressed strongly ribbed shorter than the soft silvery pappus. Microrhynchus glabra, *Wight Ic.* t. 1145. M. acaulis, *Kurz in Journ. As. Soc.* 1877, ii. 208. Lactuca glabra, *DC. in Wight Contrib.* 26; *Prodr.* 135; *Clarke Comp. Ind.* 272. L. rigida, *DC. l. c.* Youngia acaulis, *DC. Prodr.* vii. 193. Prenanthes acaulis, *Roxb. Fl. Ind.* iii. 403. P. glabra, *Heyne*, and P. rigida, *Ham. in Wall. Cat.* 3264, 3263. Prenanthes sp. *Griff. Notul.* iv. 251; *Ic. Pl. Asiat.* t. 469. Sonchus Metzianus, *Schultz-Bip. in Plant. Hohenack.* n. 522 and 1359.

SUBTROPICAL HIMALAYA; from Jamu to Bhotan. LOWER GANGETIC PLAIN; Maldah, Dinagepore, &c., CENTRAL INDIA. WESTERN PENINSULA; Canara and Nilgherry Mts.; common, *Hohenacker*. BIRMA, common, *Kurz*.

Root woody, straight, cylindric, sometimes a foot or more long and ½ in. diam. *Leaves* chiefly radical, 2–12 by ¼–1 in., nerves faint spreading. *Flowering-stems* 3–10 in., sometimes very numerous, simple or dichotomously branched. *Achenes* ¼ in., hardly beaked, with about 6 very thick smooth ribs and more slender intermediate ones.

9. **C. Stoliczkai,** *Clarke Comp. Ind.* 255; perennial ?, stemless, hirsutely pubescent, leaves all radical long-petioled narrowly obovate-spathulate sinuate-toothed or lyrate-pinnatifid, flowering stem erect naked sparingly corymbosely branched and glandular above, heads ½ in. long cylindric puberulous, outer invol. bracts minute, inner linear obtuse not thickened in fruit, achenes very narrowly fusiform not beaked finely ribbed rather longer than the soft white pappus.

WESTERN HIMALAYA; Kashmir, Tilail, alt. 12,000 ft., *Clarke*; Lahul, alt. 9500–13,000 ft., *Stoliczka*. WESTERN TIBET; Karakoram, alt. 14,000 ft., *Clarke*.

Leaves very few and narrow, 2–5 in. long, obtuse, pubescent on both surfaces. *Flowering stems* 6–12 in., rather stout but soft, often copiously glandular above; peduncles usually short, naked, with a subulate bract at the base; invol. bracts 8–10, green, with fainter margins. *Achenes* ⅙ in., very slender, distinctly narrowed upwards from the middle, red-brown; pappus persistent but easily removed.—Clarke compares this with *C. præmorsa*, Froel., and *C. multicaulis*, Ledeb.; and he further suggests that it may be *Barkhausia Roylei*, DC. (Prodr. vii. 157), but it has not the beaked achenes of that genus, nor are the leaves sessile.

*** *Flowering stem 0, or very short; heads few, subsessile amongst the leaves.*

10. **C. gracilipes,** *Hook. f.*; perennial, dwarf, glabrous, leaves all radical elongate obovate or spathulate sinuate-lobed or pinnatifid lobes obtuse entire, heads ½ in. long solitary on short slender 1-bracteate scapes, outer invol. bracts very small, inner linear subacute, achenes (unripe) much shorter than the soft silvery pappus. Lactuca, Sect. Chorisma, sp. ined., *Benth. in Gen. Pl.* ii. 526.

SIKKIM HIMALAYA; alpine region, *J. D. H.*

Root-stock long, creeping, sometimes divided. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., rather succulent, tip broad rounded or acute. *Scapes* or *peduncles* shorter than the leaves, pubescent or glabrate. *Heads* quite glabrous, 20–30-fld.; inner invol. bracts 10–12, green, or the overlapped edges pale. Closely allied to *C. depressa.*

11. **C. depressa,** *Hook. f. & Thoms.*; perennial, stemless, puberulous, leaves rosulate very stoutly petioled ovate or rounded obscurely toothed or sinuate-toothed 5-nerved from near the base, heads crowded amongst the radical leaves $\frac{1}{2}$ in. long-peduncled bracteolate, invol. bracts strap-shaped obtuse or subacute nearly glabrous, achenes very slender fusiform beaked ribbed quite smooth shorter than the white smooth pappus. C. glomerata, *Clarke Comp. Ind.* 255, *excl. syn.*

SIKKIM HIMALAYA; near the Tibetan frontier, alt. 15–17,000 ft., *J. D. H.*

Root as thick as the little finger and crown woody. *Leaves* 1–2 in. long, rather fleshy, base rounded; petiole as long or shorter, very thick. *Heads* very numerous, invol. bracts green, inner with scarious margins, base rather thickened in fruit, glabrous or with a few hispid hairs. *Achenes* $\frac{1}{4}$ in., dark brown with a pale beak; pappus $\frac{1}{3}$–$\frac{1}{2}$ in.

SECT. IV. **Hieracioides.** *Heads* rather broad, panicled or racemose; outer invol. bracts very short, inner linear 1-seriate. *Achenes* small, slender, narrowed at both ends; pappus hairs brownish, rigid, brittle.

12. **C. silhetensis,** *Hook. f.*; quite glabrous, radical leaves persistent linear-lanceolate finely acuminate narrowed into a short petiole quite entire or obscurely toothed, flowering stem sparingly dichotomously branched, branches slender erect, heads numerous panicled $\frac{1}{3}$ in. diam., peduncles slender, outer invol. bracts very small, inner linear subacute, achenes slender glabrous narrowed upwards ribbed about equalling the brown rigid pappus. Hieracium silhetense, *DC. Prodr.* vii. 218; *Clarke Comp. Ind. in Journ. Linn. Soc.* xiv. 411, 257. Prenanthes ? Candolleana, *Wall. Cat.* 3280, *in part.* Conyza foliolosa, *Wall. Cat.* 3281, *in part.*

KHASIA MTS., alt. 4–6000 ft., common. BIRMA and TENASSERIM, *Kurz.*

Perennial; rootstock stout, woody. *Leaves* 6–12 by $\frac{1}{4}$–$1\frac{1}{4}$ in., very much narrowed at both ends. *Flowering stems* often twice as long as the leaves, slender, with small leaves at the forks. *Heads* yellow, panicled, peduncles with usually a small bract. *Achenes* $\frac{1}{10}$ in., pale brown; pappus rather scanty.—A very anomalous plant, with the habit, absence of stellate hairs, and the achenes of *Crepis,* but with the brittle brown pappus of *Hieracium.*

13. **C. racemifera,** *Hook. f.*; perennial, glabrous or puberulous above, stem strict simple or branches erect, leaves scattered petioled ovate or ovate-lanceolate sinuate-toothed, petiole winged, heads in unilateral racemes, achenes much shorter than the pappus. Crepis, No. 6, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; towards the Tibetan frontier, alt. 8–14,000 ft., *J. D. H.*

Stem 6–18 in., very slender, from a small perennial rootstock. *Leaves* few, 1–$2\frac{1}{2}$ in, acute, membranous, lower and middle cauline long-petioled, petiole not auricled at the base, upper sessile. *Racemes* strict, nearly leafless, with minute bracts at the base of the peduncles, which are erect, curved at the top, and usually 1–2-bracteolate; heads campanulate, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., horizontal or drooping; outer invol. bracts very small, inner 6–10 linear acute glabrous, all green, blackish when dry; ligules yellow. *Achenes* quite immature, apparently short and not beaked; pappus not exceeding the involucre, pale brown, brittle.—A very remarkable species, whose affinity is doubtful, but I think very near *H. silhetensis,* though differing in habit and inflorescence.

SECT. V. **Glomeratæ.** *Heads* very numerous and densely crowded, sessile or shortly peduncled on the dilated top of a simple villous club-shaped stem.

14. **C. glomerata,** *Dcne. in Jacq. Voy. Bot.* 99, t. 107 (Prenanthes), *not of Clarke*; pubescent or villous, stem short soft simple clavate leafy, leaves obovate or linear-oblong entire sinuate-toothed or pinnatifid, heads cylindric, outer invol. bracts 0 or 1–2 filiform, inner 3–6 linear- or broadly oblong obtuse, achenes cylindric-oblong obscurely constricted below the shining white reddish or blue-grey rigid pappus. C. Hookeriana, *Clarke Comp. Ind.* 255.

WESTERN TIBET, *Jacquemont*; Lahul, *Captain Hay*; Barji-kang (N. of Kumaon), alt. 14,000 ft., *Strach. & Winterb.* SIKKIM; common near the Tibetan passes, alt. 13–17,000 ft., *J. D. H.*

Stem 1–6 in., densely or laxly villous, tapering into a fusiform root a foot long, soft, often $1\frac{1}{2}$–2 in. diam. at the truncate top. *Leaves* very variable, 1–5 by $\frac{1}{4}$–$\frac{1}{2}$ in., flaccid. *Heads* 50–100, forming a dense hemispheric mass mixed with filiform bracts which arise from the base of the very short peduncle, few-fld.; invol. bracts $\frac{1}{4}$–$\frac{1}{3}$ in., variable in breadth, glabrous or villous, margins membranous; ligules yellow. *Achenes* $\frac{1}{6}$ in., many-ribbed, shining, brown; pappus $\frac{1}{3}$ in. long, deciduous, hairs very variable in colour.—This is a very singular plant, the analogue of *Saussurea gossypiphora*, which it entirely resembles in habit.

DOUBTFUL SPECIES.

CREPIS PORRIFOLIA, *Don Prodr.* 164; Barkhausia porrifolia, *DC. Prodr.* vii. 157; and BARKHAUSIA ROYLEI, *DC. l. c.*, are very doubtful plants (see under *Pterotheca Falconeri and Crepis Stoliczkai*).

109. PHÆCASIUM, *Cass.*

Annual or perennial erect hispid herbs. *Radical leaves* lyrate. *Heads* small, yellow, homogamous; fl. all ligulate. *Involucre* cylindric, calyculate, bracts 1-seriate, fruiting with the midrib thickened below; receptacle flat, naked. *Achenes* terete with a broad base, finely striate, narrowed at the tip or beaked; pappus copious, deciduous, or of the outer achenes scanty.—DISTRIB. Species 2 or 3, European and Oriental.

1. **P. lampsanoides,** *Cass. in Dict. Sc. Nat.* xxxix. 387; annual, hispid or glabrate, leaves rosulate runcinate-pinnatifid, cauline few, base simple or sagittate, flowering stem corymbosely or paniculately branched, heads $\frac{1}{2}$ in. long, invol. bracts narrowly lanceolate glabrous fruiting rigid, achenes very slender curved subterete pale smooth rather larger than the very soft white pappus. P. pulchrum, *Reichb. Ic. Fl. Germ.* t. 1431. Crepis pulchra, *Linn.*; *DC. Prodr.* vii. 160; *Boiss. Fl. Orient.* iii. 846. C. youngiformis, *Koch in Linnæa*, xxiii. 690. Chondrilla pulchra, *Lamk. Encycl.* ii. 77. Youngia Kochiana, *Ledeb. Fl. Ross.* ii. 837.

WESTERN HIMALAYA; Kashmir to Lahul, alt. 7–8000 ft., *Clarke, Watt.*—DISTRIB. Westwards to the Atlantic.

Stem 1 or many from the root, 12–18 in. high. *Leaves* very variable. *Heads* on slender divaricating peduncles; fruiting invol. bracts pale, incurved. *Achenes* $\frac{1}{6}$ in. long.—This genus would be better reunited with *Crepis* as a section.

110. PTEROTHECA, *Cass.*

Annual subscapigerous hispid or glabrous herbs. *Leaves* all radical, toothed or sinuate-pinnatifid. *Heads* subcorymbose, homogamous, yellow or red, all ligulate. *Involucre* tubular-campanulate; inner bracts 1–2-seriate, equal, narrow, herbaceous, at length concave with the keel thickened, outer few small; receptacle with long hairs or bristles. *Anther-bases* sagittate, auricles acute or setaceous. *Style-arms* slender. *Achenes* slender, all subterete or the outer compressed, 8–10-ribbed, narrowed at both ends, glabrous, strongly 3-ribbed or

winged on the inner face; pappus short, hairs very slender, simple, white, subconnate, deciduous or persistent.—DISTRIB. Species 4 or 5, Mediterranean and W. Asiatic.

1. **P. Falconeri,** *Hook. f.*; hispid or glandular above or glabrate, radical leaves subsessile obovate or elongate-spathulate sinuate-toothed or pinnatifid, flowering stems leafless subcorymbosely branched above, heads $\frac{1}{2}$ in. long broadly cylindric hispid or glabrate, outer invol. bracts very small ovate, inner 8–10 linear acute midrib thickened in fruit, achenes very slender straight all terete narrowed above 8–10-ribbed, outer scaberulous, inner smooth longer than the very soft white pappus. P. bifida, *Clarke Comp. Ind.*, 256, *not of F. & M.*.

WESTERN HIMALAYA; from Kashmir, alt. 3–9000 ft. to Kunawur, *Falconer*, &c. —DISTRIB. Affghanistan.

Annual. *Radical leaves* 2–8 in., very variable. *Flowering stem* 6–18 in., slender or stout, corymbosely or paniculately branched above, with minute bracts at the forks or 0; branches spreading, usually with hispid gland-tipped hairs; peduncles naked; recept. hairs very slender, flexuous. *Achenes* $\frac{1}{8}$ in., outer sometimes imperfect white and flattened, perfect terete many-ribbed red-brown; pappus $\frac{1}{10}$ in., hairs all rather persistent.—I advance this species with much hesitation, for though differing in the achenes being all terete and uniformly ribbed from *P. bifida*, I find so much variety in the outer achenes of that plant that I suspect this may prove to be a form of it. Clarke refers De Candolle's *Barkhausia porrifolia* and *Roylei* to this, but besides the achenes being in no sense beaked, *B. porrifolia* is founded by Don on a plant of Wallich's from Nipal (where *P. Falconeri* does not occur) which is quite glabrous and glaucous; and with regard to *P. Roylei* the description is not sufficient to identify it; *P. Falconeri* does not occur in Royle's Herbarium. The genus should be merged in *Crepis.*

111. HIERACIUM, *Linn.*

Perennial, leafy, erect or scapigerous herbs, with simple and stellate hairs. *Leaves* entire or toothed, very rarely pinnatifid. *Heads* often with black glandular hairs, solitary and long-peduncled or narrowly panicled or corymbose, homogamous, yellow, rarely orange or red; fl. all ligulate. *Involucre* tubular-campanulate or broad; bracts narrow, herbaceous, inner subequal or not, outer usually smaller, unchanged after flowering; receptacle flat, naked or shortly fimbrillate. *Achenes* oblong-cylindric, 10–15 ribbed, terete or angled, base shortly contracted, top truncate; pappus copious, hairs 1–2-seriate, simple, rigid, fragile, persistent, usually dirty white or brown.—DISTRIB. Species about 150, chiefly Western European, a few Asiatic, N. American, Andean, and S. African.

The Indian *Hieracia* have been referred by Mr. Baker to European species, and I have followed his identifications, but described them from the Indian examples. The species seem as variable and difficult to define in the East as in the West, and there are several forms from the Himalaya which do not appear referable to any of the following, but are too imperfect for description. The genus wants careful study in the Himalaya.

1. **H. vulgatum,** *Koch*; *Boiss. Fl. Orient.* iii. 871; hirsute or glabrate, radical leaves persistent petioled narrowed at both ends coarsely toothed, lower cauline petioled upper sessile, heads many, peduncles straight glandular, invol. cylindric in bud floccose and with gland-tipped hairs, bracts equal alternate subacute. *Reichb. Ic. Fl. Germ.* xix. t. 1526. H. sylvaticum, *Lamk.* H. murorum, *Clarke Comp. Ind.* 256.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 6–10,000 ft.—DISTRIB. N. Asia, Europe, Arctic America.

Stolons 0. *Leaves* 3–5 in., often spotted with black in Europe. *Stem* 1–2 ft.,

stout or slender, paniculately or corymbosely branched. *Heads* ½–¾ in. diam. *Achenes* $\frac{1}{10}$ in., black; pappus as long.

2. **H. crocatum,** *Fries.*; glabrous or hirsute, stem leafy simple or branched above, radical leaves 0, cauline sessile elliptic linear-oblong or lanceolate glaucous beneath base rounded truncate or cordate entire or toothed, heads few or many and erect, peduncles downy glabrous or hirsute, invol. bracts glabrous appressed obtuse, outer often slender and recurved.

WESTERN HIMALAYA; Kashmir to Dalhousie, alt. 6–8000 ft., *Thomson, Clarke* WESTERN TIBET, *Falconer, Heyde.*—DISTRIB. Middle and N. Europe.

Stem 1–2 ft., strict. *Leaves* 1–5 in., very variable in shape. *Heads* ¾ in. diam. *Achenes* ⅙ in., cylindric, faintly ribbed, black, shining.

3. **H. prenanthoides,** *Villars*; *Boiss. Fl. Orient.* iii. 878; glabrous or hirsute, glandular above, stem leafy with spreading branches, radical leaves 0, cauline oblong or ovate or linear-oblong entire or denticulate glaucous beneath, uppermost cordate, heads in branched leafy panicled corymbs floccose and with gland-tipped hairs, invol. bracts pubescent. *Reichb. Ic. Fl. Germ.* xix. t. 1512.

NORTHERN KASHMIR, alt. 8–10,000 ft., *Clarke.*—DISTRIB. N. Asia, the Caucasus, and N. and Mid. Europe.

Stolons 0. *Stem* 2–3 ft. *Leaves* 1–3 in., rather membranous, ciliate. *Heads* 1 in. diam. *Achenes* nearly ⅙ in., strongly ribbed, red-brown.

4. **H. umbellatum,** *Linn.*; *Boiss. Fl. Orient.* iii. 877; glabrous or hirsute below, eglandular, stem leafy, radical leaves 0, cauline sessile linear or linear-oblong narrowed at the base toothed, heads glabrous or with the bracteolate peduncles stellately downy, invol. bracts many outer small recurved. *Clarke Comp. Ind.* 257, *excl. syn. and var.* γ; *Reichb. Ic. Fl. Germ.* t. 1531.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 5–10,000 ft.—DISTRIB. N. Asia to Japan, N. Persia, the Caucasus, N. and Mid. Europe, N. America.

Stolons 0. *Stem* 1–2 ft., wiry. *Leaves* 1–3 in., usually narrow and contracted at the base. *Achenes* as in *H. crocatum*, from which it appears to me very difficult to distinguish this in the Himalaya.

VAR. *lanceolata*; smaller, more slender, heads 1–3. H. lanceolatum, *Royle mss.*—Kashmir, alt. 7–8000 ft., *Clarke.* Baker regards this as a starved state of *H. umbellatum*; it is very like *H. lanceolatum* of Villars.

5. **H. virosum,** *Pall.*; *Ledeb. Fl. Ross.* ii. 856; glabrous or very sparsely hirsute, glaucous, stem stout leafy, leaves sessile short coriaceous oblong-ovate base cordate toothed glaucous beneath, heads numerous in short terminal bracteate umbellate corymbs, peduncles short stout bracteolate, invol. bracts glabrous outermost small spreading. *Reichb. Ic. Fl. Germ.* xix. t. 1536. H. umbellatum, *var.* γ rigidum, *Clarke Comp. Ind.* 258. H. corymbosum, *Pers. Synops.* ii. 374.

KASHMIR, *Falconer*; Srinuggur, alt. 7–9000 ft., *Clarke.*—DISTRIB. N. Asia from Dahuria westwards to Mid. Europe.

Stolons 0. *Stem* very stout, stiff. *Leaves* 1–3 in., crowded, gradually diminishing upwards, glabrous above, sparsely ciliate on the margins and beneath. *Corymbs* with ascending short stiff branches. *Heads* ⅔ in. diam. *Achenes* $\frac{1}{10}$ in., red-brown.

111.* HYPOCHÆRIS, *Linn.*

Perennial, rarely annual, scapigerous herbs. *Leaves* rosulate, entire toothed or pinnatifid. *Heads* long-peduncled, solitary, yellow, homogamous; fl. all ligulate. *Involucre* cylindric-oblong or campanulate; bracts ∞-seriate, ap-

pressed, unchanged after flowering, outer smaller; receptacle flat, pales narrow, usually hyaline. *Achenes* linear or oblong, terete or compressed, 10-ribbed, ribs scabrous or ciliolate, beaked or not; pappus of 1 series of feathery hairs with a few shorter simple outer or alternating ones.—DISTRIB. Species about 3, temperate and mountain plants of Northern regions, 2 widely diffused through cultivation.

H. GLABRA, *Linn.*; *Boiss. Fl. Orient.* iii. 783; annual, radical leaves subsessile obovate or elongate spathulate sinuate-toothed glabrous or scabrous, flowering stems many stout simple or branched grooved, peduncles bracteolate thickened at the top, heads $\frac{2}{3}$ in. long, invol. bracts equalling the ligules erect obtuse or acute, outer achenes truncate inner with a long slender beak. *DC. Prodr.* vii. 90; *Reichb. Ic. Fl. Germ.* t. 47; *Clarke Comp. Ind.* 258.

NILGHERRY MTS., alt. 7–8000 ft., introduced.—DISTRIB. Europe.

Leaves 2–4 in., rarely pinnatifid. *Flowering stems* 6–12 in., naked or 1–2-bracteolate; invol bracts few, unequal. *Achenes*, outer $\frac{1}{6}$ in., shorter than the pappus; inner $\frac{1}{3}$ in., beak longer than the body, very slender; pappus as long, scanty.

112. **TARAXACUM**, *Hall.*

Scapigerous milky herbs. *Leaves* radical, entire sinuate- or runcinate-pinnatifid. *Heads* solitary on leafless scapes, yellow, homogamous; fl. all ligulate. *Involucre* campanulate or oblong; bracts herbaceous, innermost 1-seriate, erect, subequal, sometimes connate below, unchanged after flowering; outer shorter, ∞-seriate, often recurved; receptacle flat, naked. *Achenes* oblong obovoid or narrow, 4–5-angled, or the outer dorsally compressed, beaked, glabrous, 10-ribbed, ribs often muricate or echinate above, beak often very long and slender; pappus copious, hairs simple, slender, unequal.—DISTRIB. Species about 6, temperate and cold regions.

1. **T. officinale,** *Wigg.*; *Boiss. Fl. Orient.* iii. 787; glabrous, or crown and scape woolly, root vertical, leaves sessile oblanceolate or linear entire toothed pinnatifid or runcinate, lobes acute more or less denticulate, heads solitary, inner invol. bracts linear often thickened or clawed at the tip, outer ovate or linear appressed or the outer reflexed, achenes narrowly obovoid ribbed, ribs muricate or echinate above the middle suddenly contracted into a very slender beak equalling or exceeding the body. *Clarke Comp. Ind.* 258.

Throughout the HIMALAYA and WESTERN TIBET, from 1–18,000 ft. MISHMI MTS., *Griffith.*—DISTRIB. Temperate and cold regions of the N. and S. hemisphere.

One of the most variable of the order. The following are the principal Himalayan forms; I am unable to distinguish them in all their states. It is remarkable that this common Himalayan plant should not be found in the Khasia or Nilgherry mountains, even as a garden escape.

VAR. *typica*; leaves deeply runcinate, outer invol. bracts reflexed. *Reichb. Ic. Fl. Germ.* t. 1404.—Ascends to 12,000 ft.

VAR. *glaucescens*; leaves glaucous runcinate, outer invol. bracts reflexed. T. Wallichii, *DC. Prodr.* vii. 147. Leontodon glaucescens, *M. Bieb.*; *Wall. Cat.* 3246.

VAR. *eriopoda*; crown densely woolly at the bases of the scape and leaves, leaves runcinate, outer invol. bracts usually reflexed. T. eriopodum, *DC. Prodr.* vii. 147. Leontodon eriopodum, *Don in Mem. Wern. Soc.* iii. 413; *Prodr.* 163; *Wall. Cat.* 3245. L. eriopus, *Spreng. Syst.* iii. 658.

VAR. *parvula*; dwarf, leaves narrow runcinate or entire sometimes linear, invol. bracts with broad or narrow white membranous margins, beak sometimes shorter than the body of the achene. Leontodon parvulum, *Wall. Cat.* 3247.—Throughout the Himalaya from 10–18,000 ft.—This includes the forms *lividum*, *salinum*, and *leptocephalum* figured in Reichb. Ic. Fl. Germ. t. 1406.

2. **T. Wattii,** *Hook. f.*; crown woolly, leaves runcinate-pinnatifid glabrous, scapes numerous pubescent above, heads broadly campanulate glabrous, outer invol. bracts few suberect or recurved, achenes white compressed acutely ribbed, ribs sparingly echinate, beak stout shorter than the body, base conical.

WESTERN HIMALAYA; Pangi, at Silundi, alt. 13,000 ft., *Watt.*

Habit of a large specimen of *T. officinale.* *Heads* broad, 1 in. diam. without the ligules. *Invol. bracts* black when dry, inner ⅔ in. long, hardly clawed at the tip. *Achenes* not quite ripe, ¼ in. long, silvery white; pappus ¼ in.—I have seen but one specimen of this remarkable species.

113. CHONDRILLA, *Linn.*

Perennial herbs. *Stem* usually branched from the base; branches slender, cylindric, rigid or virgate. *Leaves*, radical pinnatifid, cauline often entire. *Heads* terminal, homogamous; fl. all ligulate, yellow. *Involucre* cylindric; bracts ∞-seriate, outer usually very small, inner linear; receptacle flat, naked. *Achenes* oblong, subterete, many-ribbed, toothed, or with a toothed ring below the beak, beak long and slender or short and stout; pappus hairs very slender, white, many-seriate, persistent or deciduous separately.—DISTRIB. Species about 15, European and Oriental.

1. **C. graminea,** *M. Bieb.*; *Ledeb. Fl. Ross.* ii. 809; *Ic.* t. 177; quite glabrous, branches many from the base very slender, cauline leaves filiform, heads ½ in. about 8-fld. hoary, invol. cylindric, outer bracts minute, inner narrow with white membranous margins, achenes slender obscurely toothed or quite smooth below the very slender beak which about equals the body. *DC. Prodr.* vii. 142.

WESTERN TIBET; Karakoram mts., alt. 8–11,000 ft., *Clarke.*—DISTRIB. Siberia.

Stems 2–3 ft. from a woody stock, dichotomously branched. *Leaves*, radical not seen, cauline 2–3 by $\frac{1}{16}$ in., flexuous, quite entire. *Heads* subcorymbose, peduncled. *Achenes* ⅓ in. long, ribbed, sometimes quite smooth where contracted into the beak; pappus as long as the achenes, persistent, silvery.

VAR. *kashmiriana*; leaves rather broader.—S. Kashmir at Ramoo, alt. 6000 ft., *Clarke.*

2. **C. setulosa,** *Clarke mss.*; quite glabrous, much branched from the base, branches very slender, cauline leaves linear very narrow, margins naked with here and there a minute spine, heads ½ in. about 8-fld. hoary, involucre cylindric, outer bracts minute, inner narrow with a stout spinulose midrib thickening in fruit, achenes slender strongly toothed below the very slender beak which about equals the body.

BALTISTAN; at Shigar, alt. 8000 ft., *Clarke.*

Habit of *C. graminea*, differing in the spinules on the midrib of the invol. bracts, and the muricate and toothed achenes.

DOUBTFUL SPECIES.

C. SP.?; much dichotomously branched, branches stout, leaves 1–2 in. linear-oblong obtuse obscurely denticulate, heads ⅓ in., base corky in fruit, invol. bracts with a thickened midrib which is here and there spinous.—Western Tibet, Shayuk valley, alt. 8–10,000 ft., *Thomson.* This may be a var. of *C. setulosa*, but there are no ripe achenes; it also closely resembles *C. juncea*, L.

114. LACTUCA, *Linn.*

Glabrous or hispid milky herbs. *Leaves* radical and alternate, entire toothed pinnatifid or pinnate, cauline often stem-clasping and auricled. *Heads* sessile or peduncled, panicled corymbose racemose or subspicate, homogamous, yellow purple or blue; fl. all ligulate. *Involucre* usually narrow; bracts few- (rarely many-) seriate, thinly herbaceous, margins often membranous, fruiting unchanged

(except in Sect. I.) inner slender subequal, outer often very short; receptacle flat, naked. *Achenes* compressed or flattened, ovoid oblong or narrow, beaked, faces 3–∞-ribbed; ribs slender or strong, smooth or rugose, the middle one often strongest; beak slender or short and cylindric, dilated into an entire or toothed pappiferous disk; pappus copious, hairs very slender, simple, usually soft and white, but very variable, persistent or separately deciduous, sometimes with a minute outer ring.—DISTRIB. Species about 60, N. temperate regions.

The species here brought together under *Lactuca* differ greatly in habit, some approaching in this respect to species of *Launæa*, others to *Prenanthes*, and others again to *Crepis*. I have found it impossible to group them by the achenes or pappus, and I have had recourse to characters of habit.

SECT. I. Herbs (habit of *Launæa*) with radical leaves and spicate or racemose heads on long strict flowering branches. *Heads* erect or spreading, narrow, cylindric, peduncles bracteolate; invol. bracts with broad membranous margins, outer very small; ligules yellow. *Achenes* with muricate ribs; pappus silky, persistent. (BRACHYRAMPHUS, *DC.*)

1. **L. Heyneana,** *DC. Prodr.* vii. 140; tall, glabrous, leaves runcinate-pinnatifid finely spinulose or ciliate-toothed membranous radical narrowed at the base, cauline ½-amplexicaul auricled, flowering stems slender, branches erect, heads ½ in. long solitary or fascicled, fascicles distant spiked or subracemose, achenes shortly beaked muricate black half the length of the flexuous silvery persistent pappus. *Clarke Comp. Ind.* 261, *excl. some syns.* L. runcinata, *DC. in Wight Contrib.* 26. Brachyramphus Heyneana, *Wight Ic.* t. 1146; *Dalz. & Gibs. Bomb. Fl.* 132. B. sonchifolius, *Thwaites Enum.* 168, *not of DC.* B. taraxacoides, *DC. l. c.* 177; *Wall. Cat.* 3279. Prenanthes racemosa, *Roxb. Fl. Ind.* iii. 405. P. sonchifolia, *Heyne in Wall. Cat.* 3266. P. patens, *Wall. Cat.* 3258, *in part.* Microrhynchus patens, *DC. l. c.* 181. Chondrilla racemosa, *Poir. Encycl. Suppl.* ii. 330, *in part.* Sonchus calyculatus, *Roxb. mss.*

NORTH WESTERN INDIA; *Royle, Stewart.* BANDA; *Edgeworth.* WESTERN PENINSULA; common in fields. CEYLON; Galle, *Gardner.*

Annual or biennial, 1–4 ft. high; stem hollow below, often very stout and much branched. *Radical leaves* 6–12 in., very irregularly pinnatifid, teeth more cartilaginous. *Heads* rarely peduncled, bracteolate; inner invol. bracts with thickened ribs in fruit. *Achenes* $\frac{1}{10}$ in., oblanceolate, then suddenly contracted.—I have seen no Ceylon specimens, nor any of Wallich's *Prenanthes taraxacoides*, which is not in his Herbarium.

2. **L. remotiflora,** *DC. in Wight Contrib.* 26; glabrous, radical leaves obovate or obovate-spathulate or orbicular finely spinulose or ciliate-toothed membranous, radical narrowed at the base, cauline ½-amplexicaul and auricled, flowering-stems very slender, branches erect, heads ½ in. long few racemose long-peduncled, achenes shortly beaked muricate black nearly as long as the soft silvery persistent pappus. L. Schimperi, *Jaub. & Spach. Ill. Pl. Orient.* t. 281. Brachyramphus sonchifolius, *DC. Prodr.* vii. 177; *Dalz. & Gibs. Bomb. Fl.* 132. Cacalia sonchifolia, *Wall. Cat.* 3144 D.

BANDA; *Edgeworth.* SCIND; *Stocks.*—DISTRIB. Arabia.

A smaller and more delicate plant than *L. Heyneana*, with nearly entire (rarely sinuate-pinnatifid) smaller leaves, less branched flowering stems, heads solitary with peduncles as long as themselves, and achenes ⅛ in. long.

SECT. II. Herbs with intricate dichotomous stiff sometimes spinescent branches and small cauline leaves. *Heads* sessile, in spiked fascicles or solitary, erect, narrowly cylindric; invol. bracts with broad membranous margins; ligules yellow. *Achenes* indistinctly beaked, smooth; pappus silvery. (PHŒNIXOPUS, *Cass.*)

3. **L. orientalis,** *Boiss. Fl. Orient.* iii. 819; perennial, glabrous, branches white with green wings, leaves small decurrent, lower pinnatifid with spreading or incurved triangular acute entire or toothed lobes, upper linear entire elliptic or oblanceolate, heads ½ in. long in spiked fascicles sessile, achenes narrow equalling the silvery deciduous pappus. L. viminea, *Clarke Comp. Ind.* 262, *not of Schultz-Bip.* Phenopus orientalis, *Boiss. Voy. en Esp.* 390, *in note.*

Western Tibet; alt. 10–14,000 ft., *Falconer*, &c.—Distrib. Westward to Syria and Armenia.

A much intricately branched shrubby herb, the branches often spinescent, conspicuous from the silvery white branches being winged by the decurrent bases of the leaves, the blades of most of which are undeveloped. *Leaves* 1–2 in., bright green. *Heads* solitary or in fascicles of 2–5. *Achenes* ⅙ in., narrowed to both ends from the middle or a little above it, pale.—Affghan specimens have smaller heads and achenes than the Tibetan. The habit is that of *L. ramosissima*, Gren. & Godr. (Reichb. Ic. Fl. Germ. 1419), but the achene is very different.

Sect. III. Herbs with radical leaves and erect rarely spreading (*L. Clarkei*) leafy flowering-stems. *Heads* panicled, erect, rarely fascicled or drooping; peduncle bracteate; outer invol. bracts gradually passing into the inner; ligules yellow blue or purple. *Achenes* beaked; pappus silvery. (Scariola.)

* *Beak of achene capillary, white.*

4. **L. Scariola,** *Linn.*; *Boiss. Fl. Orient.* iii. 809; annual or biennial, glabrous, tall, erect, very leafy, corymbosely or paniculately branched above, leaves suberect sessile runcinate-pinnatifid spinulose-toothed midrib prickly beneath, cauline ½-amplexicaul sagittate, heads ⅓ in. long erect cylindric few-fld. panicled glabrous, outer invol. bracts triangular inner linear, achenes oblanceolate many-ribbed ribs scabrid beak capillary about equalling the body. *DC. Prodr.* vii. 137; *Reichb. Ic. Fl. Germ.* t. 1421.

Western Himalaya; from Marri to Kunawur, alt. 6–11,000 ft. Western Tibet; alt. 9–12,000 ft.—Distrib. Siberia and westwards to the British Isles and Canaries.

Stem 2–5 ft., somewhat prickly. *Leaves* 5–7 in., smooth except the midrib and nerves beneath. *Inflorescence* variable, sometimes 12 in. diam., with incurved ascending corymbose branches, at others laxly paniculate; branches and peduncles white, with many appressed green cordate bracts. *Invol. bracts* ovate, inner linear; ligules yellow or dull-reddish outside. *Achenes* ¼ in., including the very slender beak, ribbed, pale; pappus ⅕ in. Not a Nipal plant, as stated by Clarke. I have seen no specimen from east of the Sutlej.

Var. *sativa*; more succulent, quite smooth, leaves spreading pinnatifid or entire, branches of panicle shorter with more numerous bracts, achenes black. *Clarke Comp. Ind.* 263. L. sativa *Linn.*; *DC. Prodr.* vii. 138; *Roxb. Fl. Ind.* iii. 403; *Reichb. Ic. Fl. Germ,* t. 1421. L. bracteata *and* sativa, *Wall. Cat.* 3243, 3244 B. —The garden lettuce, cultivated throughout India.

5. **L. undulata,** *Ledeb. Fl. Alt.* iv. 156; *Ic. Fl. Ross.* t. 129; annual, glabrous or glaucous, stem short dichotomously branched from the base leafy, radical leaves sessile pinnatifid lobes entire or sparingly toothed, cauline ½-amplexicaul base dilated or auricled, heads 1 in. long narrow erect peduncled cylindric few-fld., outermost invol. bracts small inner unequal very slender obtuse, achenes oblanceolate transversely rugose margins scabrid, beak capillary 3–4 times as long as the body. *Boiss. Fl. Orient.* iii. 813; *DC. Prodr.* vii. 135; *Clarke Comp. Ind.* 263.

Western Tibet; alt. 9–12,000 ft., *Thomson*. Salt Range; *Fleming*.—Distrib. Siberia, Soongaria, and westwards to Arabia.

Habit of a *Senecio* of the *Jacobæa* section, 6–10 in. high, succulent. *Leaves* 2–3 in., dark green. *Heads* subcorymbose or terminal on the branches; ligules white pink or blueish. *Achenes* including the capillary beak ½–⅔ in. long, much compressed

pale, margins thickened scabrid, tip cleft embracing the base of the beak; pappus $\frac{1}{5}$ in. long, quite white.

6. **L. dissecta,** *Don Prodr.* 164; annual, glabrous or sparsely pubescent, stem dichotomously branched from the base, branches slender leafy, leaves entire or lyrate or runcinate-pinnatifid lobes entire or sparingly toothed lower petioled cauline $\frac{1}{2}$-amplexicaul base auricled or sagittate, uppermost linear, heads $\frac{1}{4}$–$\frac{1}{2}$ in. erect narrow cylindric few-fld., outermost invol. bracts minute ovate innermost narrowly linear, achenes oblanceolate transversely rugose faces 3-ribbed, beak capillary twice as long as the body. *DC. Prodr.* vii. 135; *Boiss. Fl. Orient.* iii. 814; *Clarke Comp. Ind.* 264. L. Stocksii, *Boiss. Diagn. Ser.* 2, iii. 96. L. arvensis, *Edgew. in Trans. Linn. Soc.* xx. 79. Chondrilla auriculata, *Wall. Cat.* 3269.

TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–8000 ft. WESTERN TIBET; Iskardo, alt. 8000 ft., *Clarke.* SALT RANGE; *Aitchison.*—DISTRIB. Affghanistan and Beluchistan.

This, like *L. undulata*, is senecionoid in habit and very variable. *Stem* 3–18 in. high, sometimes simple and leafless below, branching upwards; at others numerous corymbosely branched flowering stems start from the crown which bears a profusion of rosulate leaves. *Leaves* 1–4 in., very variable indeed in lobation, sometimes almost bipinnatifid. *Heads* corymbose, on very slender peduncles, erect; ligules blue. *Achenes* including the capillary beak $\frac{1}{4}$ in. long, much compressed, dull, margins most minutely scabrid, tip cleft as in *L. undulata*; pappus $\frac{1}{6}$ in. long, white.

7. **L. longifolia,** *DC. Prodr.* vii. 135; annual or biennial, glabrous, tall, erect, paniculately branched above, sometimes hispid at the base, leaves sessile very long lanceolate or linear-lanceolate acuminate entire or sparingly $\frac{1}{2}$-pinnatifid lobes very few distant acute base sagittate, heads $\frac{1}{3}$ in. long erect peduncled 12–20-fld., outer invol. bracts few ovate, inner linear-oblong, achenes elliptic or oblanceolate nearly smooth faces 3–5-nerved, beak capillary equalling or shorter than the body. *Clarke Comp. Ind.* 264. Chondrilla longifolia, *Wall. Cat.* 3273. Mulgedium sagittatum, *Royle Ill.* 252, t. 61, f. 2 (*achene bad*); *DC. l. c.* 250.

WESTERN and CENTRAL HIMALAYA; from Kashmir to Nipal, alt. 4–9000 ft., *Wallich,* &c.

Stem 3–6 ft., strict, always simple below. *Leaves* 3–6 by $\frac{1}{4}$–$\frac{3}{4}$ in. or more across the lobes when $\frac{1}{2}$-pinnatifid, in which case the lobes are very few, membranous, almost nerveless; auricles deflexed, acute, appressed to the stem. *Heads* in broad or narrow panicles, erect; peduncles slender with few bracts; invol. bracts pale green, unequal; ligules blue. *Achenes* $\frac{1}{4}$ in. including the beak, dark brown, much compressed, young with thickened margins, faces obscurely rough and most minutely scaberulous; pappus $\frac{1}{4}$ in., white.

8. **L. brevirostris,** *Champ. in Hook. Kew Journ.* iv. 237; annual, glabrous, stem tall erect paniculately branched above, leaves very long linear or linear-lanceolate acuminate quite entire or toothed base simple or shortly auricled, heads $\frac{1}{2}$ in. long erect peduncled 12–20-fld., outer invol. bracts few ovate inner linear-oblong, achenes ellipsoid much compressed smooth black beak capillary shorter than the body. *Clarke Comp. Ind.* 265. L. bialata, *Griff. Notul.* iv. 247; *Kurz in Journ. As. Soc.* 1877, ii. 206. L. squarrosa, *Miquel Prod. Fl. Jap.* 121, 362. L. amurensis, *Regel. Ind. Sem. Hort. Petrop.* 1859, 42. Prenanthes squarrosa, *Thunb. Fl. Jap.* 303.

SIKKIM HIMALAYA; Rungeet valley, *Anderson, Clarke.* KHASIA MTS.; alt. 4–6000 ft., *J. D. H. & T. T.* ASSAM, *Jenkins*; Suddya, *Griffith.*—DISTRIB. Japan, China, Philippine Islds.

Habit of *L. longifolia* and as tall, but the leaves are never pinnatifid and want the sagittate base; the achenes are quite different, very flat, black, $\frac{1}{4}$ in. long, including the beak, with one strong median rib on each face and 4 more slender lateral ones

on each side of the dorsal face; the base of the beak is black in this (white in *longifolia*); the pappus is dirty-white or yellowish. Ligules pale yellow within, purplish outside in Assam (Griffith), sulphur yellow in China (Hance in litt.).

** *Beak rather stout, coloured.*

9. **L. Clarkei,** *Hook. f.*; annual, glabrous, stem erect with lateral wide spreading branches from the base and upwards, leaves coriaceous radical linear runcinate-pinnatifid terminal lobe long-acuminate lateral triangular acute denticulate or quite entire, cauline lanceolate entire or sinuate-toothed finely acuminate sessile base simple or ½-amplexicaul not auricled, heads ½ in. long suberect numerous in peduncled clusters along the branches, peduncles bracteolate, outer invol. bracts all green ovate or oblong-ovate, inner 5–6 linear-oblong with narrow pale margins, achenes slender fusiform gradually narrowed into a cylindric beak strongly ribbed smooth black, pappus twice as long as the achenes silvery.

WESTERN TIBET; Iskardo, alt. 8000 ft., *Clarke.*

Habit of Sect. I., but evidently most closely to *L. tatarica* in the foliage heads and achenes. *Stem* 6–12 in., flexuous, and branches rather rigid. *Radical leaves* 2–4 in., sparingly toothed or lobed, stiff when dry and dull dark green, the points of the lobes and the tip being almost pungent. *Heads* neither corymbose nor panicled but clustered on short branches; invol. bracts quite smooth, acute, pale green; ligules blue. *Achenes* ⅕ in., beak pale at the tip; pappus ⅓ in., deciduous, white.

10. **L. tatarica,** *C. A. Meyer, Enum. Pl. Cauc.* 56; var. *tibetica* (achene shortly beaked); perennial? glabrous, stem stout erect leafy paniculately branched above, leaves coriaceous radical and lower sinuate-toothed or runcinate-pinnatifid and sharply toothed, cauline similar or less lobed base simple or auricled, heads erect ¾ in. panicled peduncled solitary or clustered, peduncles bracteolate, outer invol. bracts all green ovate or oblong-ovate, inner 5–6 linear-oblong, achenes narrowly oblong strongly ribbed quite smooth suddenly contracted beneath the pappus into a very short cylindric beak, pappus twice as long as the achenes silvery. *Clarke Comp. Ind.* 267.

WESTERN TIBET; Nubra, Hanli, &c., alt. 12–16,000 ft., *Thomson, Stoliczka.*—DISTRIB. of *L. tatarica*, Central Asia and Siberia.

This so strongly resembles *L. tatarica*, a native of Affghanistan, that, except for the achenes, I do not see how it can be separated; these are however of a different form, and not very like those of any other *Lactuca*; they are narrowly linear ⅓ in. long, with a very inconspicuous beak, remarkably strong ribs, of which the median ventral one is the most prominent. The tips of the leaves and their lobes are almost pungent.

SECT. IV. Perennial usually tall leafy herbs (habit of *Prenanthes*), with large tuberous or fusiform roots, and more or less pinnatifid or pinnate and sharply toothed leaves. *Heads* very numerous, drooping or pendulous, in large terminal panicles or paniculate racemes; outer invol. bracts usually very short, inner few long narrow often with dilated tips; ligules blue violet or purple. *Achenes* smooth; pappus deciduous.

11. **L. graciliflora,** *DC. Prodr.* vii. 139; glabrous or leaves puberulous, tall, leafy, paniculately branched above, lower leaves petioled pinnate or pinnatifid terminal lobe large deltoid or triangular-ovate acute irregularly toothed, pinules 1-pair, middle upper leaves like the terminal lobe of the lower, uppermost sessile ovate or lanceolate, heads very many narrow ¼–½ in. long 3–4-fld. in large open panicles glabrous drooping, peduncles slender, outer invol. bracts minute inner 5–6 very narrow with dilated tips, achenes narrowly oblong or oblanceolate smooth, margins thickened constricted at the top into a short thick beak, pappus dirty white. L. Brunoniana, *Clarke Comp. Ind.* 226, *mainly, not of Wall.* Prenanthes graciliflora, *Wall. Cat.* 3260. P. rostrata, *Bl. Bijd.* 836; *DC. l. c.* Mulgedium rostratum, *Schultz-Bip. in Miq. Fl. Ind. Bat.* ii. 115.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*. Sikkim; alt. 6-12,000 ft., *J. D. H.*, &c.—DISTRIB. Java, Sumatra.

Stem 2–6 ft., sometimes very stout at the base. *Leaves* 3–4 in., membranous, terminal lobe of the lower 2–4 by 2–2½ in., base truncate hastate cordate or suddenly narrowed into the very slender petiole, not auricled; leaves of young specimens sometimes pinnatifid throughout. *Panicles* often very large, 1–2 ft. long and almost as broad; inner invol. bracts with often spathulate tips, outer very short. *Achenes* ⅕ in., brown, ribs often obscure; pappus ¼ in., deciduous, outer very obscure.—The absence of this in the Khasia Mts. is remarkable, if, as I suppose, it is identical with the Malay Isld. plant.

12. **L. rapunculoides,** *Clarke Comp. Ind.* 268; glabrous or sparsely setose above, erect, simple or paniculately branched above, leafy, lower leaves long-petioled hastate cordate or deltoid with margins incurved entire or variously toothed, upper middle with broadly winged petioles sagittately auricled at the base, uppermost subsessile often lanceolate, heads very narrow ½–¾ in. 6–8-fld. drooping, outer invol. bracts very small, inner few very narrow with dilated tips, achenes very slender elongate-fusiform slightly compressed smooth striate narrowed into a brown beak. Mulgedium rapunculoides, *DC. Prodr.* vii. 249.

WESTERN HIMALAYA; alt. 9-12,000 ft., Kashmir and Lahul, *Thomson*, *Clarke*; Kumaon, *Strach. & Winterb.*; Nipal, *Wallich*.

A smaller plant (2–3 ft.) than *L. graciliflora*, with longer and sometimes sparsely hispid heads of the same shape which have also like it often spathulate tips, but differing in the leaves, which are never pinnate or pinnatifid, but often hastate, with wide spreading lateral and a produced mid-lobe, and very different achenes, ⅓ in. long, very narrow, slightly compressed, with rounded sides and faces, all equally striated, ribs slender; pappus very caducous, dirty white, rather shorter than the achenes.—This has the achenes of a *Prenanthes*, but is too closely allied to *L. graciliflora* to be dissociated from it.

13. **L. decipiens,** *Clarke Comp. Ind.* 266; glabrous, stem tall paniculately branched above, lower leaves (rarely entire) runcinate-pinnatifid with a broad hastate terminal lobe coarsely toothed, cauline with long winged petioles dilated and auricled at the base, uppermost lanceolate, heads ⅔ in. long 6–8-fld. cylindric peduncled glabrous drooping, outer invol. bracts oblong-ovate obtuse half the length of the 5–6 linear-oblong inner which are glabrous or dorsally setose, achenes oblanceolate narrowed into a short dark beak smooth faces ribbed. Mulgedium decipiens, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; Kashmir and Dras, alt. 8–10,000 ft., *Thomson*, *Clarke*.

Very similar to *L. rapunculoides*, but the heads are larger, and the outer invol. bracts much longer, the lower leaves are not hastate nor the upper sagittately auricled; and the achenes are very different. *Ligules* blue. *Achenes* ¼ to nearly ⅓ in. long, compressed, rather suddenly contracted into the beak, which is ¼ the length of the body, dorsal face with many equal ribs, ventral with a strong midrib and lateral fainter ones; pappus ¼ in., dirty white.

VAR. *multifida*; stem 1–1½ ft., leaves crowded at the base of the stem all pinnatifid with narrow coarsely toothed and cut lobes, heads larger, achenes nearly ⅓ in. with rather longer beaks, the upper half of which is white.—Kashmir, *Thomson*, *Clarke*.

14. **L. hastata,** *DC. Prodr.* vii. 139; glabrous pubescent or hispidly hairy above, tall, erect, often very robust, paniculately branched above, leaves large polymorphous usually pinnatifid or pinnate with a hastate deltoid or ovate coarsely toothed acuminate terminal lobe, pinnules or lobes few or many, petiole slender and simple or dilated at the base or winged lobulate and auricled, heads ¾ in. long subcampanulate 10–30-fld., peduncles nodding, outer invol. bracts oblong-ovate half as long as the 8–10 linear-oblong glabrous or setose inner, achenes obovate or elliptic flat, beak slender pale equalling the body. *Clarke*

Comp. Ind. 267. Chondrilla hastata, *Wall. Cat.* 3217. Sonchus robustus *and* hastatus, *Wall. Cat.* 3249, 3250. S. Cyanus, *Don Prodr.* 164. Mulgedium cyaneum *and* robustum, *DC. l. c.* 249, 250. M. nilgherryense, *Wight Ic.* t. 1144. Melanoseris paniculata, *Edgew. in Trans. Linn. Soc.* xx. 80.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–12,000 ft. KHASIA MTS.; alt. 5–6000 ft. NILGHERRY MTS.

One of the tallest and most robust species, 4–7 ft. high, but occurring in dwarf and slender forms, from perfectly glabrous to glandular-hispid all over, the latter in western specimens. *Leaves* sometimes a foot long and 4–6 in. broad, of various shapes, rarely large and runcinate-pinnatifid, petiole sometimes a foot long. *Inflorescence* very various; the heads usually subracemose or the branches of contracted or spreading panicles, sometimes as narrow as in *L. graciliflora*, but this is rare; ligules blue purple or dark red. *Achenes* very uniform, ¼ in. long including the beak, quite flat, irregularly ribbed, dark brown, suddenly contracted into a brown cleft tip in which the white beak is seated; pappus ¼ in., very deciduous, dirty-white, outer ring of bristles distinct.

SECT. V. Perennial tuberous rooted herbs, with soft ascending stems and branches and very membranous pinnate or pinnatifid leaves that are scarcely, if at all, toothed. *Heads* terminating the branches, pendulous, narrow; peduncles ebracteate; invol. bracts few, outer gradually longer: ligules blue or purple. *Achenes* smooth; pappus deciduous.

15. **L. macrorhiza,** *Hook. f.*; glabrous or sparsely villous, branches many from the root ascending long or short (sometimes reduced to a 1-headed scape) soft terete leafy irregularly divided above, leaves membranous linear or elongate obovate pinnatifid or pinnate upper sometimes entire, pinnules or lobes usually numerous oblong-orbicular quite entire, petiole quite simple or dilated or winged with a very broad orbicular entire or toothed auricle, heads ½–⅔ in. long terminating the branches peduncled drooping or inclined 6–16-fld., outer invol. bracts lanceolate very much shorter than the 6–10 linear-oblong inner, achenes flat elliptic-lanceolate smooth narrowed into a white beak ⅔ the length of the body, pappus silky white. L. lævigata, *Clarke Comp. Ind.* 269. L. Hoffmeisteri, *Klotzsch in Reise Pr. Waldem. Bot.* 81, t. 80. Mulgedium lævigatum, *DC. Prodr.* vii. 249. M. macrorhizum, *Royle Ill.* 251, t. 61; *DC. Prodr.* vii. 251. Prenanthes lævigata, *Wall. Cat.* 3259. Melanoseris saxatilis, *Edgew. in Trans. Linn. Soc.* xx. 72.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 6–16,000 ft.

From 3 in. to 3 ft. high, in some Alpine forms reduced to a few leaves 2–3 in. long and one or more 1- or few-headed scapes; in its largest state the stems are as thick as a goose quill. *Leaves* excessively variable, usually narrow and pinnate with a slender rachis, sometimes reduced to a single orbicular oblong ovate cordate or hastate lobe, upper sessile with auricled bases, lower petioled; petiole simple and slender or winged, the wing sheathing at the base or dilated into a large orbicular toothed lobe clasping the stem. *Heads* from glabrous to densely villous, irrespective of the altitude at which the plant grows or its other characters; ligules blue or purple, large for the size of the head. *Achenes* ⅙–¼ in. including the slender beak, about 5-ribbed on either face, almost black; pappus equalling the achene, deciduous, outer inconspicuous.

16. **L. Lessertiana,** *Clarke Comp. Ind.* 270; perennial, glabrous or laxly villous, stem short stout (or 0) leafy simple or branched from the base, leaves very variable elongate oblanceolate and entire or shorter sinuate-toothed or pinnatifid acute, margins and lobes subentire, petiole 0 or simple at the base, heads ¾ in. long subcylindric or campanulate 12–24-fld. terminating the branches or subpaniculate erect or drooping black glabrous or villous, outer invol. bracts few linear or 0, inner linear-oblong obtuse, achenes flattened elliptic or oblanceolate suddenly narrowed into a stout pale beak, pappus shorter than the achene.

Mulgedium ? Lessertianum, *DC. Prodr.* vii. 251. Hieracium Lessertianum, *Wall. Cat.* 3254. Melanoseris lyrata, *Dcne. in Bot. Jacq. Voy.* 101, t. 109.

TEMPERATE and ALPINE HIMALAYA; from Kashmir, alt. 8–13,000 ft., to Sikkim, alt. 9–16,000 ft.

Stem 0–12 in., sometimes stout with many erect lateral flowering branches, at others slender and nearly simple. *Leaves* always membranous, with nearly entire margins, in one extreme form 6–8 by 1 in., very narrowly oblanceolate, quite entire, obtuse, narrowed into a long petiole; in another as long but broader, pinnatifidly lobed; in others 1–2 in., entire or runcinate. *Heads* on long or short flaccid peduncles; blackish, sometimes densely villous with long hairs; ligules blue. *Achenes* ¼ in. including the stout beak, black, strongly ribbed; pappus white or yellowish, very deciduous.—This is nearly related to *L. macrorhiza*, though differing a good deal in habit and in the achene.

SECT. VI. Perennial tall branched leafy herbs. *Heads* loosely panicled, large, nodding or pendulous; peduncle ebracteolate; invol. bracts broad, many-seriate, outer gradually larger, all regularly imbricate; ligules blue. *Achenes* long, narrow; pappus white or yellowish, brittle.

17. **L. macrantha,** *Clarke Comp. Ind.* 267; glabrous or pubescent above, tall, stout, branched above, leafy, leaves large glabrous sessile oblong pinnatifid acutely irregularly toothed base with broad-toothed auricles, heads few 1–1½ in diam. campanulate peduncled terminating the branches inclined or nodding, invol. bracts broadly ovate regularly imbricate ciliate inner oblong subacute, achenes equalling the brown fugacious pappus flattened oblanceolate or narrowly elliptic ribbed smooth narrowed into a stout paler beak much shorter than the body. Mulgedium macranthum, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*, *Clarke.*

Stem 1–2 ft., usually very stout, smooth. *Leaves* 3–9 by 1–3 in., glaucous beneath, terminal lobe usually triangular-ovate. *Heads* blackish when dry; peduncles curved, usually pubescent; ligules blue. *Achenes* ⅓–½ in.; pappus rigid, brittle.

18. **L. bracteata,** *Hook. f. & T. in Clarke Comp. Ind.* 270; hispid, tall, simple or paniculately branched above, leafy, leaves sessile ovate or oblong-ovate acute acutely toothed abruptly cordate or contracted into a cordate auricled ½-amplexicaul base, heads ½–1 in. broad many-fld. campanulate in open leafy panicles with long slender branches and peduncles or in leafy racemes inclined or drooping, invol. bracts membranous broadly ovate subacute imbricate inner oblong obtuse, achenes oblanceolate or narrowly elliptic smooth ribbed flattened gradually narrowed into a slender white beak as long as the body longer than the white pappus. Melanoseris bracteata, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Lachoong Valley, alt. 8–10,000 ft., *J. D. H.*

Stem slender, 1–3 ft. *Leaves* tolerably uniform, 3–6 by 1½–2½ in., membranous: those in the inflorescence lanceolate, acuminate. *Heads* rather numerous; invol. bracts without white margins, reticulated, speckled with red; ligules blue. *Achenes* ⅓ in. including the very slender beak; pappus brittle.—This is somewhat intermediate between this section and Sect. IV.

SECT. VII. A perennial robust simple or sparingly branched leafy hispid herb. *Heads* loosely panicled, large, nodding, clothed with black glandular hairs; peduncle ebracteolate; outer invol. bracts few, narrow; ligules yellow. *Achenes* long, narrow; pappus white, persistent. (DUBYÆA, *DC.*)

19. **L. Dubyæa,** *Clarke Comp. Ind.* 271; leaves simple or the lower lobed at the base or pinnatifid, radical 0 or petioled, cauline ovate hastate or oblong-ovate sinuate-toothed, petiole winged, base ½-amplexicaul, upper sessile oblong or cordate base broadly auricled, heads 1 in. diam. few peduncled nodding

or drooping many-fld. and peduncles hispid with black glandular hairs, outer invol. bracts few linear or subulate, inner 12–15 linear-oblong acute, achenes slender slightly compressed rather longer than the white pappus narrowed gradually into pale slender beak. Dubyæa hispida, *DC. Prodr.* vii. 247; *Wall. Cat.* 3253. Hieracium heteranthum, *Wall. Cat.* 3253. H. hispidum, *Don Prodr.* 165.

CENTRAL HIMALAYA; from Kumaon, alt. 9000 ft., to Sikkim, alt. 11–14,000 ft.

Root fusiform. *Stem* 6–18 in. *Leaves* 3–6 by 1–2 in., more or less hispid on both surfaces. *Heads* broadly campanulate, black when dry; peduncles curved, stout. *Achenes* ⅓ in. long, nearly black except the pale beak, ribbed; pappus more persistent than in the two preceding sections.

SECT. VIII. Herbs with radical long-petioled leaves, and one or more corymbosely branched erect flowering stems. *Heads* small, numerous, erect; peduncles slender, ebracteate; outer invol. bracts minute, inner all equal, linear, green; ligules yellow. *Achenes* small, smooth; pappus silvery or yellowish. (IXERIS, *Cass.*)

20. **L. sagittarioides,** *Clarke Comp. Ind.* 265; biennial?, glabrous, leaves all radical long-petioled sagittate acute or obtuse entire or denticulate, flowering stems erect naked corymbosely branched above, heads ⅓ in. long, achenes as long as the white pappus elliptic-lanceolate gradually narrowed into the slender white beak. L. sagittata, *Herb. Ind. Or. H. f. & T.* Chondrilla sagittata, *Wall. Cat.* 3270.

WESTERN and CENTRAL HIMALAYA; from Dharmsala to Nipal, alt. 5–6000 ft.—DISTRIB. Upper Birma.

Leaves 2–3 in. long and as broad, lateral lobes horizontal or depressed, sometimes obsolete when the leaf is lanceolate, more rarely in pairs on each side; petiole 6–10 in., with a coriaceous entire wing that narrows downwards. *Flowering stems* 6–18 in., slender, sometimes sparsely hairy above, bracts at the forks minute. *Heads* erect; outer invol. bracts very small, inner 6–10, linear-oblong; ligules yellow. *Achenes* $\frac{1}{11}$ in. including the beak, which is much shorter than the body.

21. **L. polycephala,** *Benth. in Gen. Pl.* ii. 526; annual, glabrous, slender, radical leaves petioled very long narrow linear or lanceolate flaccid entire sinuate-toothed or pinnatifid base narrowed, cauline sessile oblong or lanceolate base sagittate auricles acute, flowering stems simple or branched, heads ⅙–¼ in. diam. many-fld. in dichotomous or subumbellate corymbs or panicles, achenes as long as the silvery pappus elliptic-lanceolate strongly ribbed narrowed into a short slender brown beak. *Clarke Comp. Ind.* 272. Ixeris polycephala, *Cass.*; *and* I. fontinalis, *DC. Prodr.* vii. 151. Chondrilla fontinalis, *Wall. Cat.* 3268. C. tenuis, *Ham., and* longifolia, *Ham. in Wall. Cat.* 3274.

NORTHERN INDIA; in wet places from Kashmir and the Gangetic plain to Sikkim, the Khasia mts., Bengal, Assam, and Birma, ascending the Himalaya to 6000 ft.—DISTRIB. Affghanistan.

A flaccid annual, 6–18 in., with long membranous leaves 3–10 by ¼–¾, rarely pinnatifid, when the lobes are usually few, slender and horizontal; cauline often broader than the radical, finely acuminate, with sometimes forked auricles. *Heads* 10–20-fld., erect; outer invol. bracts minute; inner 6–10, linear-oblong, green; ligules yellow. *Achenes* ⅛ in., red-brown, hardly compressed, smooth, with about 10 very strong smooth ribs.—The subumbellate character of the inflorescence is very exceptional in the genus.

22. **L. gracilis,** *DC. Prodr.* vii. 140; glabrous, slender, radical leaves very long linear or linear-lanceolate acuminate quite entire rarely toothed or ciliate, cauline sessile base often ciliate not auricled, flowering stems slender simple or forked, heads ⅙–¼ in. long few-fld. narrow in open often excessively branched corymbs, achenes about equalling the dirty white pappus compressed

narrowly elliptic-lanceolate narrowed into a brown beak $\frac{1}{3}$–$\frac{1}{4}$ as long as the body. *Clarke Comp. Ind.* 271. Chondrilla (Crepis?) gracilis, *Wall. Cat.* 3267.

NIPAL, *Wallich.* KHASIA MTS., alt. 3–5000 ft., *De Silva*, &c. BHOTAN, *Griffith.*

A flaccid annual? *Leaves* 4–6 by $\frac{1}{3}$–$\frac{1}{2}$ in., erect, usually quite entire. *Flowering stems* 6–18 in., few solitary or many from the root. *Heads* 3–8-fld., erect; outer invol. bracts minute, inner 4–8 linear; ligules yellow. *Achenes* $\frac{1}{12}$ in. including the slender beak, pale red, much compressed, many-ribbed; pappus deciduous, more scanty, brittle, and coarser than in *L. sagittarioides* and *polycephala.*—The small heads, pappus, and cauline leaves simple at the base, at once distinguish this from *L. polycephala*, than which this has usually far more heads. It appears closely allied to a Java plant of Horsfield's named by Miquel *Aracium lævigatum*, which is the *Prenanthes lævigata* of Blume (not of Wallich), and *Lactuca lævigata*, DC.

VAR. *khasiana*, Clarke mss.; heads $\frac{1}{3}$ in. long, achenes $\frac{1}{6}$ in. beak shorter.—Khasia mts., alt. 3–5000 ft., *J. D. H. & T. T.*

DOUBTFUL SPECIES.

L. BENTHAMII, *Clarke Comp. Ind.* 273, from Kashmir (Kavang and Karnag, alt. 12–15,000 ft., *Stoliczka*) is unknown to me. Clarke describes it as a glaucous herb, with dichotomous scapes 4–6 in. high, spathulate oblong entire or obscurely toothed 3-nerved leaves, cylindric heads with many purple flowers, 8 equal oblong inner invol. bracts, small outer, and a 1-seriate dirty-white pappus.—It is not Bentham's new species of *Chorisma*, which is *Crepis gracilipes* (p. 396).

115. PRENANTHES, *Linn.*

Glabrous or hispid milky herbs, often tall and slender, sometimes subscandent. *Leaves* alternate, usually petioled, sagittate or cordate, pinnatifid or lyrate, membranous, petiole often winged, upper narrow sessile or stem-clasping. *Heads* small (slender pendulous and few-fld. in the Indian species), loosely panicled or racemed, of various colours, homogamous; fl. all ligulate. *Involucre* cylindric; inner bracts long and narrow, 1–2-seriate, equal, thinly herbaceous, unchanged after flowering, outer few small; receptacle flat, naked. *Achenes* narrowly oblong or contracted at both ends, slightly compressed or 3–5-angled, usually ribbed, tip with a pappiferous disk; pappus hairs 2–3-seriate, simple, slender or rigid, separately deciduous.—DISTRIB. Species about 16, N. temperate regions.

The Indian species referred here to *Prenanthes* by Bentham (in Gen. Plant.) and Clarke (Comp. Ind.) are identical in habit with Section V. of *Lactuca*, from which they are distinguishable only by the achene less suddenly contracted at the tip, and less flattened. *L. rapunculoides* (p. 407) is perhaps a *Prenanthes.*

1. **P. Khasiana,** *Clarke Comp. Ind.* 273; slender, erect, glabrous or sparsely hairy, leaves long-peduncled, radical deltoid base cordate lower pinnate, lateral pinnules petioled terminal simple or 3-lobed, panicle elongate branches very slender, heads narrow pendulous cylindric glabrous, flowers 1–4 blueish purple, achenes contracted slightly above and below, pappus brown brittle.

KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.

Stem 1–4 ft. *Leaves* membranous, ciliate-toothed, lower 8–10 by 3–4 in.; pinnules 2–3 pair, alternate, oblong or ovate-cordate, base equal or very oblique, acute and apiculate; terminal lobe ovate or deltoid, base cordate or hastate; upper pinnatifid; petiole of the radical leaves very slender, 4–8 in., of cauline shorter. *Panicles* 1–2 ft., strict; branches erect, ultimate and peduncles filiform with few small bracts. *Heads* $\frac{1}{2}$–$\frac{2}{3}$ in. long; outer invol. bracts minute, inner 3–4 linear obtuse. *Achenes* very narrow, $\frac{1}{5}$ in., compressed, truncate, brown, ribbed, equalling the scanty pappus.—Habit of *Lactuca graciliflora.*

2. **P. Brunoniana,** *Wall. Cat.* 3278; erect, subhispid or glabrous, leaves polymorphous simple lobed pinnatifid or pinnate ovate or cordate or deltoid or

oblong toothed or serrate, petiole winged or not, panicle erect elongate branches stout or slender, heads fascicled narrow glabrous, flowers 3-5 rose-purple, achenes narrowed downwards, pappus nearly white. P. hispidula, *DC. Prodr.* vii. 195; *Clarke Comp. Ind.* 273. P. Brunoniana alliariæfolia *and* raphanifolia, *DC. l.c.*

Western Himalaya; from Kashmir to Kumaon, alt. 6-9000 ft.

Stem 1-4 ft., from glabrous to hispid with long spreading hairs, simple or branched. *Leaves* so variable that it is difficult to arrange their forms under any system: 1 (*alliariæfolia*), leaves entire, cordate or ovate or oblong, with the base truncate or cordate obtuse or acute, petiole simple slender auricled at the base; 2 (*raphanifolia*), leaves more or less pinnatifid with a terminal ovate lanceolate or deltoid acute terminal lobe to which the leaf is sometimes reduced, petiole broadly winged dilated or not at the base; 3. leaves orbicular or broadly oblong, palmately 3-lobed, lobes cut and toothed, petiole simple or toothed (when the leaf becomes pinnatifid). *Heads* $\frac{1}{4}$-$\frac{2}{3}$ in.; outer invol. bracts $\frac{1}{6}$-$\frac{1}{3}$ the length of the inner. *Achenes* $\frac{1}{5}$-$\frac{1}{3}$ in., narrow, compressed, slightly contracted at the tip; pappus scanty, brittle, white or pale brownish.

3. **P. violæfolia,** *Dcne. in Bot. Jacq. Voy.* 100, t. 108; stem very slender simple quite glabrous or with soft hairs at the top of the petiole, leaves long-petioled ovate-cordate deltoid or hastate tip and auricles obtuse or acute entire or obscurely sinuate-toothed glaucous beneath, petiole simple or winged or dilated at the base, heads racemose or subpaniculate narrow pendulous long-peduncled 5-8-fld., achenes ellipsoid shorter than the white pappus. Lactuca violæfolia, *Clarke Comp. Ind.* 269.

Western Himalaya; from Kashmir to Kumaon, alt. 9-12,000 ft.

A small very slender species, a foot high, simple or sparingly branched. *Leaves* 1-2 in. long and broad; petiole of the lower 3-8 in., simple or dilated at the base, sometimes into a foliaceous orbicular toothed auricle, rarely with a pair of oblong pinnules below the blade, nerves radiating from the tip of the petiole. *Heads* few, subsolitary, pendulous; invol. bracts $\frac{1}{2}$ in., outer very small, inner linear obtuse. *Achenes* $\frac{1}{8}$ in., contracted at both ends, but not beaked.

4. **P. Hookeri,** *Clarke mss.*: stem simple or branched, glabrous except the petiole and leaf-nerves beneath which are often setose, leaves hastate or cordate obtuse quite entire rarely sinuate uppermost ovate or oblong, petiole not longer than the blade with a broad $\frac{1}{2}$-amplexicaul wing dilated downwards and auricled at the base, heads 3-6-fld. racemose or panicled narrow pendulous, peduncle long, achenes narrowly elliptic compressed contracted towards both ends about equalling the white pappus. P. alata, *Herb. Hook. f. & T.*; *Clarke Comp. Ind.* 274; *Kurz in Journ. As. Soc.* 1877, ii. 207.

Khasia Mts.; in marshy places, alt. 4-6000 ft. Martaban Mts.; dry hills, alt. 5-6000 ft., *Kurz.*

Stem 1-3 ft., quite glabrous, simple and slender or stout and much branched. *Leaves* 1-2 in. long and broad, basal lobes spreading or deflexed; petiole with flexuous hairs underneath and towards the top only, wing gradually narrowed to the insertion of the leaf-blade or below it. *Flowers* blue purple. *Achenes* $\frac{1}{6}$ in., broader and darker than in *P. violæfolia*, from which this differs conspicuously in the short petioles.—Clarke suggests the alteration of the name from *alata*, which should be retained for the *P.* (*Nabalus*) *alata*, Hook. f., N. America. Clarke describes the achenes as cylindric, but I find all to be flattened. I have seen no Martaban specimens.

5. **P. sikkimensis,** *Hook. f.*; quite glabrous, stem elongate very slender flexuous branched, leaves very membranous quite entire with slender petioles winged towards the base simple (not auricled) deltoid with rounded tip and lobes or with a pair of pinnules on the petiole, heads panicled solitary long-peduncled pendulous 5-6-fld., achenes large fusiform compressed equalling the white pappus.

SIKKIM HIMALAYA; Lachen valley, alt. 9000 ft., *J. D. H.*

A very slender branched species, 3–4 ft. high, with membranous leaves 1–1½ in. diam., very glaucous beneath, and heads as in the other species, but achenes ¼ in. long, narrowed towards both ends.

6. **P. scandens,** *Hook. f. & T.*; *Clarke Comp. Ind.* 274; scandent, glabrous puberulous or pubescent, branched, flexuous, leaves ovate or triangular-ovate acuminate ciliate base truncate cordate or hastate, petiole shorter than the blade quite simple, heads in axillary and terminal panicles with divaricating branches shortly peduncled pendulous glabrous, achenes very slender almost beaked shorter than the whitish pappus.

SIKKIM HIMALAYA, alt. 4–9000 ft., common. UPPER ASSAM; Mishmi Mts., *Griffith.*

A tall flaccid rambling climber, with zig-zag stem and branches. *Leaves* nearly glabrous in Sikkim, pubescent with crisped hairs in Mishmi. *Leaves* 3–5 by 2–3 in., glaucous beneath, margins with strong projecting remote cilia; petiole ¼–1½ in. *Heads* ½ in. long; ligules rose-purple. *Achenes* ⅕ in., much more slender than in any of the preceding species and more nearly beaked, being much attenuated from above the middle; pappus nearly white.

116. PICRIDIUM, *Desf.*

Perennial or annual glabrous milky herbs. *Leaves* radical or alternate, toothed or pinnatifid, lobes often crisped and toothed or spinulose. *Heads* campanulate, yellow, homogamous; fl. all ligulate. *Involucre* campanulate; bracts ∞-seriate, thinly herbaceous, innermost subequal lanceolate unchanged in fruit, outer shorter broader with scarious margins; receptacle flat, naked. *Achenes* oblong, truncate at both ends, constricted at the tip; ribs 4–5, thick, transversely rugose; pappus hairs ∞-seriate, slender, simple, soft, white, connate at the base into a deciduous ring.—DISTRIB. Species 5 or 6, Europe, N. Africa, W. Asia.

P. tingitanum, *Desf.*, *Boiss. Fl. Orient.* iii. 827; annual, stem stout, radical leaves elongate-obovate or spathulate obtuse sinuate-toothed or pinnatifid denticulate, cauline ½-amplexicaul auricled, peduncle thickened under the head, invol. bracts cordate with very broad membranous margins and thickened tips, inner oblong, achenes 4-angled or of 4 moniliform ribs. *DC. Prodr.* vii. 182; *Clarke Comp. Ind.* 275. P. orientale, *DC. l. c.* Scorzonera tingitana *and* orientalis, *Linn.*

The PUNJAB, *Jacquemont*; Futtehgurh, *Edgeworth*; Tilla rocks and Byree, common, *Aitchison.*—DISTRIB. Affghan and Beluchistan, Persia, Arabia, and N. Africa to the Canaries, S. Europe.

Stem 6–18 in., glabrous. *Leaves* 1–5 in., variable in breadth. *Heads* 1½ in. diam. *Achenes* $\frac{1}{10}$ in. long, pale, corky; pappus ½ in., very soft and white.

VAR. *subintegra*, Boiss. l. c. 828; tall, robust, cauline leaves 3–4 in. linear-oblong quite entire or obscurely denticulate.—Ajmir, *Jacquemont.* This looks a very different plant, except in the head, from *P. tingitanum*, being tall, with the stem as thick as a goose-quill and quite entire oblong leaves; it is probably a state growing in rich soil.

117. SONCHUS, *Linn.*

Annual or perennial milky herbs. *Leaves* radical or alternate, cauline often stem-clasping, entire toothed or pinnatifid, segments often spinulose-toothed. *Heads* terminal, irregularly subcorymbose umbellate or panicled, yellow, homogamous; fl. all ligulate. *Involucre* ovoid campanulate or cylindric, often dilated thickened and conic at the base; bracts ∞-seriate, herbaceous, outer smaller; receptacle flat, naked. *Achenes* ovoid obovoid or ellipsoid, compressed, not beaked, ribbed, ribs smooth or transversely rugose; pappus copious, hairs ∞-seriate, very slender, simple, usually white and united at the base into a deciduous

ring.—DISTRIB. Species about 24, N. temp. regions and Central Asia, a few spread over the world with cultivation.

1. **S. asper,** *Vill.*; *Boiss. Fl. Orient.* iii. 796; annual, glabrous or sparsely glandular above, subumbellately branched, leaves lanceolate ½-amplexicaul with rounded auricles entire or pinnatifidly toothed, heads crowded, achenes compressed, faces 3-ribbed obscurely muricate between the ribs. *Reichb. Ic. Fl. Germ.* t. 1410; *Clarke Comp. Ind.* 275. S. ferox, *Wall. Cat.* 3248. S. oleraceus, *Wall. Cat.* 3252 F.

Throughout INDIA; in fields and cultivated places, ascending to 12,000 ft. in the Himalaya.—DISTRIB. All temperate and many tropical countries, wild or introduced.

By many considered a subspecies of *S. oleraceus*. Clarke remarks that in India this flowers from December to April, and *S. oleraceus* from April to May.

2. **S. oleraceus,** *Linn.*; *Boiss. Fl. Orient.* iii. 795; annual, glabrous or sparsely glandular-hispid, subumbellately branched above, leaves lanceolate ½-amplexicaul with acute auricles entire or pinnatifid, heads crowded, achenes compressed, faces 3-ribbed and muricate between the ribs. *Reichb. Ic. Fl. Germ.* t. 1410, f. 1; *Clarke Comp. Ind.* 275. S. ciliatus, *Lamk.*; *Wight Ic.* t. 1141. S. Royleanus, *Wall. Cat.* 3252; *DC. Prodr.* vii. 184.

Throughout INDIA; in fields and cultivated places, ascending to 8000 ft. in the Himalaya.—DISTRIB. of *S. asper*.

3. **S. arvensis,** *Linn.*; *Boiss. Fl. Orient.* iii. 798; rootstock creeping, stem glabrous tall umbellately branched above, leaves runcinate-pinnatifid spinous-toothed cauline ½-amplexicaul with appressed rounded auricles uppermost linear, heads and peduncles glandular-hispid, achenes narrow subcompressed with thick regular ribs on each face. *Reichb. Ic. Fl. Germ.* t. 1412; *Clarke Comp. Ind.* 276. S. Wightianus, *DC. Prodr.* vii. 187; *Wight Ic.* t. 1142. S. orixensis, *Roxb. Fl. Ind.* iii. 402. S. Wallichiana, *DC. l. c.* 185. S. longifolius, *Wall. Cat.* 3251.

Throughout INDIA; wild and in cultivated places, scarce in the plains, common in the Khasia and Himalaya, ascending to 8000 ft.—DISTRIB. of *S. asper*.

4. **S. maritimus,** *Linn.*; *Boiss. Fl. Orient.* iii. 797; perennial, glabrous, glaucous, rootstock creeping, stem sparingly branched above, leaves linear-oblong quite entire or sparingly sinuate-toothed, cauline ½-amplexicaul with acute auricles, heads few peduncled glabrous, achenes ellipsoid subcompressed margins thickened faces with a thick middle rib and 2 more slender lateral ones. *Reichb. Ic. Fl. Germ.* t. 1413? S. arvensis, β, *Clarke Comp. Ind.* 276.

The PUNJAB; Peshawur, *Stewart*.—DISTRIB. Westwards to the Atlantic.

118. LAUNÆA, *Cass.*

(MICRORHYNCHUS, *Less.*)

Perennial glabrous herbs, with yellow (always?) juice. *Leaves* chiefly radical, sinuate-lobed or pinnatifid, margins often spinulose-toothed. *Heads* peduncled or lateral and sessile on the branches, racemose or paniculate, or solitary or fascicled, yellow, homogamous; fl. all ligulate. *Involucre* campanulate or cylindric; bracts ∞-seriate, herbaceous, margins often membranous, inner subequal, outer various, keel often thickened in fruit; receptacle flat, naked. *Anther-bases* sagittate, auricles setaceous. *Style-arms* slender. *Achenes* narrow, subterete angled or slightly flattened, rarely winged, truncate at both ends or rarely emarginate; ribs 4–5 very stout, close-set, smooth papillose or narrowly winged or 2-grooved, truncate at each end; pappus copious, hairs ∞-seriate

simple, very slender, white, a few inner sometimes longer and stronger, all connate at the base into a deciduous ring.—DISTRIB. About 20 species, European, African and W. Asian.

* Achenes not winged.

† *Heads terminal on the paniculately branched flowering stems.*

1. **L. aspleniifolia,** *DC. Prodr.* vii. 181 (Microrhynchus); biennial or perennial, glabrous, radical leaves sinuate-lobed or pinnatifid, cauline few, flowering stems many from the root, branches dichotomous divaricating, heads ⅓ in. terminal paniculate peduncles bracteate, outer invol. bracts small inner linear margins membranous, achenes minute columnar angled and ribbed, ribs rough much shorter than the very soft straight white pappus. Microrhynchus aspleniifolius, *DC.*; *Clarke Comp. Ind.* 276. Prenanthes dichotoma, *Wall. Cat.* 3275. P. aspleniifolia, *Willd.?*; *Roxb. Fl. Ind.* iii. 404.

Plains of INDIA; from the Punjab to Assam and southwards to the Soonderbunds, Circars, Andamans, Birma and Tenasserim.

Leaves 3–6 in., sessile or shortly petioled, narrowly obovate, lobes minutely toothed. *Flowering stems* ascending, almost naked, 6–18 in. long; peduncles with usually one or two subulate bracts; invol. bracts quite glabrous. *Achenes* $\frac{1}{12}$ in., pale, very narrow; pappus ⅓ in., deciduous, hairs of about equal length, with no stronger inner ones.—De Candolle quotes *Hieracium dichotomum* of Roxb. Fl. Ind. under this, but no such name is published by Roxburgh, though he gave it in mss. Roxburgh describes this as perennial or biennial and stoloniferous, which latter I have never seen it to be.

2. **L. chondrilloides,** *DC. Prodr.* vii. 183 (Zollikoferia); perennial, glabrous, erect, radical leaves rosulate runcinate-pinnatifid lobes numerous very unequal much irregularly acutely toothed, cauline sessile auricled irregularly toothed or pinnatifid, flowering stems few or many stout dichotomously branched, heads terminal ½–1 in. long, peduncles bracteate, invol. bracts glabrous outer ovate-lanceolate intermediate equalling the oblong-lanceolate inner, achenes slender columnar strongly ribbed, ribs scaberulous rather shorter than the soft white pappus. Microrhynchus chondrilloides, *Clarke Comp. Ind.* 277. Sonchus Candolleanus, *Jaub. & Spach Ill. Pl. Orient.* iii. t. 279. Zollikoferia mucronata, *Boiss. Fl. Orient.* iii. 822.

The PUNJAB; Mooltan, *Edgeworth*, low hills at Rawul Pindee, *Aitchison.* SCIND, *Stocks, Dalzell*, &c.—DISTRIB. Affghanistan, Persia, Arabia, Egypt.

Leaves 3–5 in., narrow, subsessile. *Flowering branches* 6–18 in., often stout, leafy at the axils; peduncles stout, thin, bracteoles ovate toothed; invol. bracts without membranous white edges, bases at length thickened. *Achenes* ¼ in. pale; outer pappus hairs numerous, excessively slender, very soft, inner few much longer nearly ½ in. rigid much stouter but quite smooth.

3. **L. microcephala,** *Hook. f.*; annual, small and very slender, sparsely villous, radical leaves obovate-spathulate entire or sinuate-lobed, flowering stems filiform dichotomously branched, heads ¼ in. long cylindric, peduncles capillary ebracteolate, invol. bracts glabrous or puberulous outer minute inner linear midrib thickened in fruit, achenes slender linear truncate at both ends, striate, much longer than the scanty white pappus. Crepis microcephala, *Clarke mss.*

WESTERN TIBET; Iskardo, alt. 9000 ft., *Clarke.*

Root very slender. *Radical leaves* ½–1 in., petioled, sparsely pubescent with spreading hairs. *Flowering stems* several, erect 2–7 in., pubescent below, with sessile oblong leaves at the lower forks, the upper naked; invol. bracts 6–8 with narrow white margins, hardened in fruit. *Achenes* ⅛ in., dark brown when ripe, outer slightly curved; pappus $\frac{1}{12}$ in. very soft, white, persistent,—I refer this to *Launæa*

(with some hesitation, and against Mr. Clarke's opinion), because the achenes are not at all contracted at either end, and appear to me to differ from those of any Indian *Crepis.* The habit is very close to that of small forms of *Crepis japonica*, but the achenes are entirely different.

†† *Heads more or less racemose on the flowering stem or its branches.*

4. **L. secunda,** *Clarke Comp. Ind.* 27 (Microrhynchus), *excl. syn.*; glabrous or sparsely hispid, radical leaves sessile runcinate- or lyrate-pinnatifid lobes rounded irregularly lobulate and sharply toothed, cauline 0 or very few, flowering stems subsolitary tall strict simple or sparingly forked, heads ⅓ in. long narrow in subsessile racemed subsecund clusters, invol. bracts with white membranous margins, outer small ovate inner linear midrib much thickened in fruit, achenes columnar angled and strongly ribbed as long as the very soft white pappus. Chondrilla secunda, *Royle mss.*

WESTERN HIMALAYA; from Hazara to Kumaon, alt. 4–8000 ft., *Royle*, &c.

Annual? *Radical leaves* 4–8 by 1–2 in. obovate or elongate-obovate, with many lobes, coriaceous. *Flowering stems* 1–3 ft., terete, strict; branches erect, racemose, 1 foot and under, quite erect. *Invol. bracts* with scarious white edges, hard and connivent in fruit with soft green tips overtopping the pappus, midrib much thickened. *Achenes* ⅛ in., pale, smooth, many ribbed, slightly thicker in the middle; pappus excessively soft, with a few rigid rather longer hairs.

5. **L. nudicaulis,** *Less. Synops.* 139 (Microrhynchus); glabrous, leaves sinuate-lobed pinnatifid or runcinate lobes irregularly lobulate and sharply toothed teeth often white and cartilaginous, flowering stems decumbent or spreading irregularly branched, heads ½-⅔ in. long narrow sessile solitary or clustered subracemose and terminal, invol. bracts with white membranous margins, outer very short ovate, inner long linear midrib thickened in fruit, achenes columnar very thickly ribbed outer compressed, much shorter than the soft straight white pappus. Microrhynchus nudicaulis, *Less.*; *DC. Prodr.* vii. 180. M. fallax, *Jaub. & Spach Ill. Pl. Orient.* t. 276. Zollikoferia nudicaulis, *Boiss. Fl. Orient.* iii. 824. Chondrilla nudicaulis, *Linn. Mant.* 278. Lactuca nudicaulis, *Murray.* L. obtusa, *Clarke Comp. Ind.* 261. Prenanthes patens *and* P. dichotoma, *Wall. Cat.* 3258, 3275, F. P. obtusa, *Ham. in Wall. Cat.* 3276. P. procumbens, *Roxb. Fl. Ind.* iii. 405. Brachyramphus obtusus, *DC. Prodr.* vii. 177; *Deless. Ic. Sel.* iv. t. 96.

Plains of INDIA; from Bengal and Behar to the Punjab, ascending the WESTERN HIMALAYA to 8000 ft. in Kumaon. SCINDE and the DECCAN.—DISTRIB. Affghanistan and westwards to the Atlantic.

Root perennial? with yellow juice. *Leaves* 2–10 by 1–3 in., usually sessile. *Flowering stems* usually very numerous, 6–24 in. long, spreading on all sides, stout or slender, simple or branched. *Heads* sometimes 6–10 in a cluster; invol. bracts overtopping the pappus. *Achenes* $\frac{1}{14}$ in., very pale, polymorphous, inner sometimes as if composed of 4 thick ribs, outer slightly curved and flattened with a thick ventral and several thick dorsal ribs, all smooth or obscurely uneven; pappus ⅓-½ in., very deciduous, hairs very straight soft and of nearly equal length.

††† *Heads solitary or fascicled at the nodes of the flagelliform rooting flowering stem.*

6. **L. pinnatifida,** *Cass. in Ann. Sc. Nat.* xxiii. 85; glabrous, leaves runcinate-pinnatifid or sinuate-toothed or lobed, flowering stems procumbent long flagelliform rooting and leafing at the nodes, heads at the nodes solitary or clustered ½ in. long usually with bracteate peduncles, invol. bracts with white membranous margins, outer short, intermediate longer, inner linear midrib at the base hardening in fruit, achenes columnar very thickly ribbed much shorter than the soft straight white pappus. Microrhynchus sarmentosus, *DC. Prodr.*

vii. 181; *Wight. Ill.* t. 133; *Clarke Comp. Ind.* 277. Prenanthes sarmentosa, *Willd. Sp. Pl.* iii. 1540; *Wall. Cat.* 3262, A. B. C. Lactuca sarmentosa, *DC. in Wight Contrib.* 27.

Sandy coasts of INDIA; from Bengal to Ceylon. Penang. Madras and Malabar.—DISTRIB. Mauritius, Egypt, E. African coast.

Leaves 1–3 in., rarely more, teeth rarely white and cartilaginous (as in. *L. nudicaulis*). *Flowering stems* slender, 1–3 ft. long, arching from node to node. *Invol. bracts* almost 3-seriate, as in *L. nudicaulis*. *Achenes* $\frac{1}{12}$ in., pale, thick with few very thick rounded ribs, usually obtusely 4-gonous; pappus $\frac{1}{4}$ in., deciduous, hairs very slender, white and of nearly equal length.

** Achenes winged; invol. bracts 3-seriate, outer very broad, all with broad membranous margins. (LOMATOLEPIS, *Cass.*)

7. **L. glomerata,** *Cassini in Dict. Sc. Nat.* xlviii. 422 (Lomatolepis); glabrous, leaves sessile sinuate-lobed pinnatifid or runcinate, lobes usually short rounded toothed, teeth cartilaginous white, flowering-branches spreading sparingly dichotomously branched, heads $\frac{1}{2}$–$\frac{2}{3}$ in. campanulate clustered at the ends of the branches, invol. bracts with very broad membranous margins outer large broadly ovate, inner oblong, base hardened in fruit, achenes corky thickly ribbed outer 2-winged inner columnar shorter than the soft straight white pappus. Lomatolepis glomerata, *Cass.*; *DC. Prodr.* vii. 180. Microrhynchus glomeratus, *Jaub. & Spach Ill. Pl. Orient.* iii. t. 275. Zollikoferia glomerata, *Boiss. Fl. Orient.* iii. 826. Sonchus capitatus, *Spr. Syst. Veg.* iii. 650.

The PUNJAB; *Stewart.* SCINDE; *Stocks.*—DISTRIB. Persia, Arabia, Egypt, Algiers.

Perennial? *Leaves* 3–5 by 1–1$\frac{1}{2}$ in., lobes or pinnules numerous, close set. *Flowering branches* stout, strict, usually not exceeding the leaves, naked. *Heads* broader than in other Indian species, with broader 3-seriate more obtuse invol. bracts, and more numerous flowers; peduncles short, bracteolate. *Achenes* $\frac{1}{6}$ in., pale yellow; outer slightly curved, linear-oblong, emarginate at both ends, wings each as broad or broader than the nucleus, which is ventrally and dorsally 5–6-ribbed, wings and ribs minutely crenulate; inner achenes often narrower and imperfect; pappus $\frac{1}{4}$ in. long, deciduous, hairs subequal with no inner stronger ones.

119. TRAGOPOGON, *Linn.*

Biennial or perennial milky-juiced herbs. *Leaves* alternate, stem-clasping, narrow, quite entire. *Heads* terminal; long-peduncled, large, homogamous, yellow blue or purple; fl. all ligulate. *Involucre* cylindric or narrowly campanulate; bracts 1-seriate longer or shorter than the flowers, herbaceous, acuminate, bases sometimes connate, outer 0; receptacle flat or convex, pitted, margins of the pits often cartilaginous. *Achenes* slender, terete, 5-angled, 5–10-ribbed, ribs smooth or muricate, basal areole broad concave, inner usually with a slender beak; pappus hairs numerous, 1-seriate, feathery, connate into a basal ring, 5–10 longer than the rest with simple (not feathery) tips, those of the outer achenes often fewer, subpaleaceous, free at the base, simple or feathery below.—DISTRIB. Species about 20, Europe, N. Africa, temp. and subtrop. Asia.

1. **T. gracile,** *Don in Mem. Wern. Soc.* iii. 407; *Prodr.* 162; quite glabrous, leaves very narrow linear keeled flexuous, radical often equalling the scape, invol. bracts 5–8 shorter than the yellow ligules, achenes $\frac{1}{2}$ in. smooth beak not conspicuous. T. junceum, *Wall. Cat.* 3257; *DC. Prodr.* vii. 115; *Clarke Comp. Ind.* 278.

CENTRAL and WESTERN HIMALAYA; from Hazara to Nipal, alt. 6–10,000 ft., ascending to 13,000 ft. in Piti and Kunawur.

Leaves 3–10 by $\frac{1}{8}$–$\frac{1}{4}$ in., base dilated. *Scape* 1-rarely 2-3-fld., not thickened under the head. *Invol. bracts* $\frac{1}{2}$–$1\frac{1}{4}$ in. long. *Achenes* beak not long nor slender.

2. **T. pratense,** *Linn.*; *Boiss. Fl. Orient.* iii. 747; glabrous, stem usually branched and leafy, leaves gradually narrowed from a broad sheathing base, peduncle hardly thickened under the head, invol. bracts about 8 equalling or exceeding the yellow ligules, achenes long-beaked muricate. *DC. Prodr.* vii. 113.

WESTERN HIMALAYA and WESTERN TIBET; alt. 12–14,000 ft., *Thomson*, &c.—DISTRIB. Westward to the Atlantic.

Stem 6–24 in., leafy, often stout. *Leaves* $\frac{1}{6}$–$\frac{1}{3}$ in. diam. about the middle. *Invol. bracts* $\frac{1}{2}$–3 in. long. *Achenes* $\frac{3}{4}$ to nearly 1 in., beak equalling or shorter than the body, very slender.

3. **T. porrifolium,** *Linn.*; *Boiss. Fl. Orient.* iii. 745; glabrous or cottony, stem usually branched and leafy, leaves gradually narrowed from a very broad sheathing base, peduncle much inflated under the head, invol. bracts about 8 exceeding the purple ligules, achenes long-beaked muricate. *DC. Prodr.* vii. 113.

WESTERN TIBET; *Falconer.* SIMLA; in cultivated places, *Thomson.*—DISTRIB. Westwards to the Mediterranean.

Habit of *T. pratense*, distinguished by the swollen peduncle and purple ligules; the achenes are 1 in. long in Tibetan specimens and much muricated.

120. SCORZONERA, *Linn.*

Perennial, rarely annual herbs. *Leaves* alternate or radical, entire lobed or pinnatisect. *Heads* large, long-peduncled, yellow, homogamous; fl. all ligulate. *Involucre* cylindric or campanulate; bracts ∞-seriate, thinly herbaceous, acute or the inner acuminate, outer gradually (rarely suddenly) smaller; receptacle naked or pitted, rarely villous. *Achenes* linear, subterete or the outer angled, ∞-ribbed, rarely 2–3-winged, basal areole broad, hollowed; pappus hairs ∞-seriate, unequal, serrulate or feathery, 5–10 usually longer and with simple (not feathery) tips.—DISTRIB. Species about 100, Europe, N. Africa, W. and Centr. Asia.

SECT. I. **Eu Scorzonera.** *Achenes* terete or angled, not winged.

1. **S. divaricata,** *Turcz.*; *DC. Prodr.* vii. 125; glabrous, stem slender simple or branched, leaves slender curved, heads cylindric, invol. bracts 4–8 3-4-seriate glabrous or pubescent, ligules yellow, achenes $\frac{2}{3}$ in. very slender longer than the pappus smooth. *Clarke Comp. Ind.* 278. S. virgata, *DC. l. c.?* *S. Roylei, DC. l. c.*

WESTERN HIMALAYA; from Kashmir to Kunawur; and WESTERN TIBET; alt. 9–15,000 ft., *Falconer*, &c.—DISTRIB. Mongolia.

Root woody. *Stem* branched from the base or above only, rarely simple, grooved, branches divaricate. *Leaves* 2–6 by $\frac{1}{10}$–$\frac{1}{6}$ in., margins incurved. *Heads* 1–$1\frac{1}{2}$ in.; 5–8-fld.; outer invol. bracts short, broad, inner long linear. *Achenes* pale, smooth, striate; pappus hairs feathery below.

2. **S. purpurea,** *Linn.*; *Boiss. Fl. Orient.* iii. 768; glabrous or sparsely woolly, stem slender, leaves narrowly linear shorter than the stem, heads few large cylindric, invol. bracts imbricate pubescent outermost ovate inner lanceolate shorter than the purple ligules, achenes angled shorter than the pappus, ribs rugose.

KASHMIR; Banahal, alt. 8000 ft., *Thomson.*—DISTRIB. Asia Minor.

I have seen only 2 specimens, from Kashmir, which want the tufts of fibres at the

crown, and have unripe achenes; they however entirely resemble Caucasian ones of *S. purpurea.*

SECT. II. **Pterachænia,** *Benth. in Gen. Plant.* ii. 532. *Achenes* 2–3-winged.

3. **S. Stewartii,** *Hook. f.*; stemless, scapigerous, leaves linear or slightly dilated beyond the middle woolly or glabrate below, scapes usually shorter than the leaves naked, heads solitary tomentose or glabrate, outer invol. bracts ovate acute inner oblong-lanceolate, achenes linear-oblong with 2 broad or 3 narrower white wings, ribs echinate.

The PUNJAB; Peshawur, *Stewart*; low hills at Hurroo, *Aitchison.*

Annual. *Leaves* 3–8 by $\frac{1}{10}$–$\frac{1}{6}$ in., grassy, 3-nerved, subacute. *Scape* stout, erect or decumbent, ribbed. *Heads* $\frac{1}{2}$–1 in. long; invol. bracts variable in length and breadth, shorter than the yellow ligules. *Achenes* linear or linear-oblong, $\frac{1}{3}$ in. long, wings entire or toothed equalling or broader than the very narrow strongly ribbed dark body of the achenes; ribs with an irregular row of horizontal spinules; pappus reddish, as long as the achenes.

DOUBTFUL SPECIES.

S. BUPLEUROIDES, *Don Prodr.* 162; "root fusiform, stem simple erect 1-fld. nearly 1 foot high terete glabrous, leaves linear-lanceolate acute flat glabrous villous at the base shorter than the stem. invol. bracts longer than the yellow striate ligules, pappus unequal scabrid."—Alps of Nipal, *Wallich.*—I have no idea what this can be.

121. EPILASIA, *Bunge.*

Annual low herbs. *Leaves* chiefly radical, quite entire. *Peduncles* usually thickened and hollow. *Heads* terminal, homogamous; fl. all ligulate. *Involucre* campanulate or ovoid; bracts few, inner sub-2-seriate, outer 3–6, leafy erect or spreading; receptacle flat, naked. *Achenes* short, cylindric or subturbinate, 10–20-ribbed, glabrous, base not contracted, areole hollowed, tip truncate and raised and dome-shaped within the pappus; pappus dark brown, most densely many-seriate, silky, hairs feathery a few longer the others with simple (not feathery) tips.—DISTRIB. Species 5, Western and Central Asia.

E. ammophila, *Bge. in Reliq. Lehm.* 202; annual, glabrous, leaves very narrowly linear or dilated about the middle 3-nerved quite entire or obscurely serrulate, outer invol. bracts leafy spreading often much longer than the ligules inner ovate-lanceolate obtuse, achenes closely ribbed. E. Bungei, *Clarke Comp. Ind.* 279.

The PUNJAB; Peshawur, *Vicary, Stewart.* Salt Range, *Fleming*; low hills at Rawul Pindee, *Aitchison.*—DISTRIB. Beluchistan, Affghanistan, Turkistan.

Stemless or with a rather stout leafy stem 6 in. high. *Leaves* 1–4 by $\frac{1}{6}$–$\frac{1}{3}$ in., tip obtuse cartilaginous. *Scapes* 1 or more, 2–6 in., stout, naked. *Heads* solitary $\frac{1}{3}$–$\frac{1}{2}$ in., campanulate; outer invol. bracts very variable in length and breadth, sometimes $2\frac{1}{2}$ in. long and slender, at others short and broad, 3-nerved with cartilaginous tips; ligules blueish. *Achenes* $\frac{1}{5}$ in. long, sometimes nearly as broad and then connate in pairs, about 20-ribbed, ribs obscurely crenulate.—Bunge describes the achene as retrorsely scabrid, which is hardly the case in the Indian specimens.

ORDER LXXVIII.* STYLIDIEÆ. (By C. B. Clarke.)

Herbs, rarely undershrubs. *Leaves* alternate or falsely whorled, entire. *Flowers* in racemose cymes, panicles or corymbs; hermaphrodite or unisexual. *Calyx* adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-lobed. *Corolla*

* The numbering of the five preceding Orders, pp. 1, 17, 210, 215, 219, should be respectively 73, 74, 75, 76, 77.

gamopetalous, rarely regular. *Stamens* 2; filaments connate with the style into a column; anther-cells ultimately subconfluent. *Ovary* inferior, 2-celled. *Stigma* at the apex of the column. *Ovules* in each cell ∞, on the middle of the dissepiment. *Capsule* 1-2-celled, 2-valved, the two valves cohering at the base, or at the base and top. *Seeds* numerous, minute, albuminous; embryo minute, next the hilum.—Species 100, Australian, with a few in S. E. Asia, N. Zealand, and Antarctic America.

1. STYLIDIUM, *Swartz.*

Corolla irregularly 5-lobed; lobes 4, suberect in pairs, and 1 smaller recurved. *Column* of stamens elongate, apex at first deflexed, elastically reflexed when irritated.—Species 85 Australian, and 3 Indian.

1. **S. Kunthii,** *Wall. Cat.* 3759; stems short stout usually pubescent when young, leaves terminal subrosulate obovate-orbicular, peduncles 1 or more leafless dichotomous, corolla white. *DC. Prodr.* vii. 335; *H. f. & T. in Journ. Linn. Soc.* ii. 8. S. Brunonis, *Griff Notul.* iv. 275. S. uliginosum, *Kurz in Flora,* 1872, 303, *and in Journ. As. Soc.* 1877, pt. ii. 212.

Throughout EASTERN BENGAL and BRITISH BIRMA; in grassy flats, from the Sikkim and Khasia Terai to Chittagong, *H. f. & T.*, and Mergui, *Griffith.*

Height 1–8 in. Rosulate *leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., often petioled, with scattered smaller ones below them. *Bracts* usually 2, opposite at the forks of the peduncle, $\frac{1}{6}$–$\frac{1}{4}$ in., linear-oblong. *Flowers* sessile at the forks, minute. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in., linear; valves dehiscing from the top, recurved.

2. **S. uliginosum,** *Swartz in Gesellsch. Nat. Berlin Mag.* 1807, 52. t. 2, fig. 4; stem hardly any, leaves subrosulate obovate-orbicular, peduncles 1 or more leafless dichotomous, corolla white. *DC. Prodr.* vii. 336; *H. f. & T. in Journ. Linn. Soc.* ii. 8. S. sinicum, *Hance in Walp. Ann.* ii. 1030.

CEYLON; in moist places, *Walker*; near Colombo, *Champion, Thwaites.* MALACCA, *fide H. f. & T.*—DISTRIB. South China, North Australia.

Glabrous, 1–8 in.—Closely resembling *S. Kunthii,* and united therewith by Kurz.

3. **S. tenellum,** *Swartz in Gesellsch. Nat. Berlin Mag.* 1807, 51, t. 2, fig. 3, *not of Br.*; stem simple erect leafy, leaves scattered oblong or oblong-obovate gradually smaller upwards, corolla rosy or purplish. *H. f. & T. in Journ. Linn. Soc.* ii. 8; *Kurz in Flora,* 1872, 304. S. roseum, *Kurz in Journ. As. Soc.* 1876, pt. ii. 137; 1877, pt. ii. 212.

DACCA; in swamps, *Clarke.* CHITTAGONG, *Kurz.* MERGUI, *Griffith* (Kew Distrib. n. 3450). MALACCA, *fide Swartz.*

Stem glabrous, 4–8 in., dichotomous. Lower *leaves* $\frac{1}{3}$ in., narrowed to the base; upper passing gradually into bracts. *Bracts* $\frac{1}{6}$ in., linear, mostly solitary at each fork of the cyme. *Flowers* sessile. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in., linear; valves united at the top and base.

VAR. *minima*; stems 1–2 in., 1–4-flowered.—Chota Nagpore, at Hazaribagh, alt. 2000 ft., *C. B. Clarke.*

ORDER LXXIX. GOODENOVIEÆ. (By C. B. Clarke.)

Shrubs or herbs; juice not milky. *Leaves* alternate or radical, very rarely opposite; stipules 0. *Flowers* axillary or terminal, racemose or panicled, irregular or regular. *Calyx-tube* adnate to the ovary; limb 5-fid or nearly obsolete. *Corolla-lobes* 5, valvate in bud. *Stamens* 5, inserted at the base of the corolla, alternate with its lobes; anthers free or connate in a ring round the style. *Ovary* 1–2-celled. *Style* simple, with a cup-shaped indusium including the

stigma. *Ovules* in each cell 1 or many, on the dissepiment. *Fruit* a drupe or capsule. *Seeds* albuminous; embryo next the hilum.—Species 200, Australian; a few in temp. America, New Zealand, and S. E. Asia.

1. **SCÆVOLA,** *Linn.*

Leaves entire or toothed. *Flowers* axillary, in short cymes or solitary. *Corolla* oblique, split to the base behind. *Anthers* free. *Ovary* 2–1-celled, with 2 erect ovules. *Fruit* a drupe.—Species 60, 50 Australian, 8 Polynesian, 2 Asiatic.

1. **S. Koenigii,** *Vahl Symb.* iii. 36; leaves petioled obovate-oblong obtuse herbaceous, calyx-lobes linear-lanceolate enlarged in fruit. *Lamk. Ill.* t. 124, fig. 2; *DC. Prodr.* vii. 505; *H. f. & T. in Journ. Linn. Soc.* ii. 8; *Kurz in Journ. As. Soc.* 1877, pt. ii. 212. S. sericea, *Forst.*; *DC. l. c.* 506. S. Taccada, *Roxb. Hort. Beng.* 15, *and Fl. Ind.* i. 527; *Ham. in Trans. Linn. Soc.* xvii. 250; *Wall. Cat.* 1314; *Wight Ill.* t. 137; *DC. l. c.* 505; *Dalz. & Gibs. Bomb. Fl.* 134. S. Lobelia, *Ham. in Trans. Linn. Soc.* xvii. 250; *De Vriese Goodenov.* 20–26, *and in Ned. Kruidk. Arch.* ii. 20, *not of Linn.* S. Plumieri, *Blume Bijd.* 730, *not of Vahl.* S. montana, *Lab. Sert. Austr. Caled.* 41, t. 42. S. velutina, *Presl. in Rel. Hænck.* ii. 57. S. Bela-Modagam, *Roem. & Sch. Syst.* v. 163; *DC. l. c.* 505. S. Leschenaultiana, *DC. l. c.* 506. S. macrocalyx, *De Vriese Gooden.* 26, t. 3, fig. 1–4. S. chlorantha *and* Lambertiana, *De Vriese l. c.* 27, 28. S. lativaga, *Hance in Walp. Ann.* ii. 1054. Lobelia frutescens, *Linn. Fl. Zeyl.* 148. L. Taccada, *Gaertn. Fruct.* i. 119, t. 25. L. Plumieri, *Burm. Fl. Ind.* 186, *not of Linn.* Cerbera salutaris, *Lour. Fl. Cochinch.* 136.—*Rumph. Herb. Amb.* iv. t. 54; *Rheede Hort. Mal.* iv. t. 59.

Sea shores of INDIA; from Scinde to Ceylon, and from Birma to Malacca.—DISTRIB. Tropical E. Asia, Australia, and Polynesia.

A shrub; stem and branches stout. *Leaves* 3–5 in., alternate, entire or rarely obscurely crenate, silky or glabrescent, tufted in the axils. *Cymes* axillary, much shorter than the leaves; bracts small. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{4}$ in.; fruiting often much longer and obtuse. *Corolla-tube* $\frac{3}{4}$ in., narrow, pubescent; lobes $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate. Indusium of the *stigma* ciliate. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ in., subspherical, very succulent; endocarp bony.

2. **S. Lobelia,** *Linn.*; *Oliver Fl. Trop. Afr.* iii. 462; leaves petioled elliptic obtuse fleshy, calyx-lobes very short obtuse or subobsolete. S. Plumieri, *Vahl Symb.* ii. 36; *Lamk. Ill.* t. 124, fig. 1; *DC. Prodr.* vii. 506; *H. f. & T. in Journ. Linn. Soc.* ii. 8. S. senegalensis, *Presl Rel. Hænck.* ii. 59; *DC. l. c.* 507. S. uvifera, *Stocks*; *Wight Ic.* t. 1613. S. Thunbergi, *Eckl. & Zeyh.*; *DC. l. c.* S. Macræi *and* Sieberi, *De Vriese Goodenov.* 31, 33. Lobelia Plumieri, *Linn. Sp. Pl.* 1317; *Jacq. Amer.* 219, t. 179, fig. 88, *not of Burm.*—*Plum. Pl. Amer.* t. 165, fig. 1.

Seashores of CEYLON and the SOUTH DECCAN; SCIND.—DISTRIB. Warm shores of both hemispheres.

Closely resembles *S. Koenigii*, except in the points stated; the leaves are smaller, 2–3 in. long.

ORDER LXXX. **CAMPANULACEÆ.** (By C. B. Clarke.)

Herbs or undershrubs, sometimes twining, often with milky juice. *Leaves* alternate or opposite, entire toothed or rarely lobed; stipules 0. *Inflorescence* axillary or terminal, solitary subpaniculate or racemose; uppermost leaves reduced to small bracts; bracteoles 0 (except in *Sphenoclea*). *Calyx* inferior or superior; limb 4–6-partite, usually persistent. *Corolla* always superior, regular

or irregular, tubular, rotate or campanulate; lobes valvate in bud. *Stamens* 4–6, alternating with the corolla-lobes, inserted with the corolla on the margin of the epigynous disk (in *Sphenoclea* on the corolla-tube); anthers free or united in a tube. *Ovary* 2–5-celled; placentas in the inner angle of the cell, many-ovuled. *Style* cylindric; stigma-lobes as many as ovary-cells. *Fruit* capsular, baccate or dry (in *Sphenoclea* spuriously circumsciss). *Seeds* very many, small, ellipsoid, albuminous; embryo erect, radicle next the hilum.—Species 1000, scattered throughout the globe.

TRIBE I. **Lobelieæ.** *Corolla* 2-lipped, cleft dorsally to the base. *Anthers* connate.

Berry indehiscent . . . . 1. PRATIA.
Capsule 2-valved at the crown . . . . 2. LOBELIA.

TRIBE II. **Campanuleæ.** *Corolla* regular. *Anthers* free or imperfectly connate.

* *Capsule loculicidal within the calyx-teeth.*

Small herbs; corolla very small stellately 5-partite; capsule $\frac{1}{10}$ in. diam. . . . . 3. CEPHALOSTIGMA.
Corolla campanulate; capsule altogether inferior, $\frac{1}{8}$–$\frac{1}{2}$ in. . . . 4. WAHLENBERGIA.
Corolla tubular inflated upwards; capsule with a conical superior beak . . . . 5. LEPTOCODON.
Corolla campanulate; capsule with a conical superior beak . . 6. CODONOPSIS.
Capsule consisting of the conical beak, enclosed in the calyx-tube 7. CYANANTHUS.

** *Fruit indehiscent or membranous, breaking up irregularly.*

Berry fleshy, crowned by a flat disk . . . . 8. CAMPANUMÆA.
Slender prostrate herb; flowers very small; fruit small inferior, membranous . . . . 9. PERACARPA.
Leaves large succulent; flowers 2-ranked in a dense scorpioid spike . . . . 10. PENTAPHRAGMA.
Flowers in a dense cylindric spike, capsule circumsciss . . . . 11. SPHENOCLEA.

*** *Capsule dehiscent at the base or sides below the calyx-teeth.*

Corolla rotate, ovary 2-celled . . . . 12. PHYTEUMA.
Corolla campanulate rarely rotate, ovary 3–5-celled . . . . . 13. CAMPANULA.

1. PRATIA, *Gaud.*

Herbs. *Leaves* alternate, toothed. *Peduncles* axillary, 1-flowered. *Calyx* inferior, limb 5-partite. *Corolla* oblique, 2-lipped; upper lip 2-partite, lower 3-lobed. *Staminal tube* free or nearly so; 2 lower anthers with 1 or more terminal bristles, 3 upper naked. *Ovary* inferior, 2-celled; placentæ hemispheric; stigma 2-lobed or emarginate. *Berry* ellipsoid, crowned with the calyx-teeth. *Seeds* very many, minute.—Species 15, S. E. Asia, Australia, N. Zealand, and S. America.

1. **P. begonifolia,** *Lindl. in Bot. Reg.* t. 1373; small, creeping, rooting, pubescent, leaves petioled cordate-ovate. P. zeylanica, *Hassk. Cat. Bogor.* 106. P. Nummularia, *Kurz in Journ. As. Soc.* 1877, pt. ii. 210. Lobelia Nummularia, *Lamk. Dict.* iii. 589. L. begoniæfolia, *Wall. Cat.* 1306; *in As. Res.* xiii. 377; *in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 115. L. Horsfieldiana, *Miq. Fl. Ind. Bat.* ii. 577. Piddingtonia Nummularia, *DC. Prodr.* vii. 341; *H. f. & T. in Journ. Linn. Soc.* ii. 26. Rapuntium Nummularium, *Presl Prodr. Lob.* 30.

NIPAL, SIKKIM, BHOTAN, ASSAM, KHASIA MTS., and PEGU, alt. 2–7000 ft., frequent. —DISTRIB. Malaya, S. China.

Leaves $\frac{1}{4}$–$\frac{1}{2}$ in. diam., denticulate. *Peduncles* $\frac{1}{2}$–$1\frac{1}{2}$ in., distant, none from the upper axils. *Calyx-teeth* $\frac{1}{6}$ in., linear. *Corolla* green with pink marks. *Anthers* 5, nearly black; 2 surmounted by 1 bristle each, 3 puberulous. *Berry* $\frac{1}{3}$ in., shortly ellipsoid, finally smooth, black. *Seeds* compressed, ellipsoid, smooth.

2. **P. montana,** *Hassk. Cat. Bogor.* 106; glabrous, branches long, leaves petioled lanceolate tapering at both ends. Lobelia montana, *Reinw.*; *Blume Bijd.* 728; *DC. Prodr.* vii. 386. Speirema montanum, *H. f. & T. in Journ. Linn. Soc.* ii. 27. Piddingtonia patens *and* montana, *Miq. Fl. Ind. Bat.* ii. 573.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from Nipal to Mishmi, common. UPPER ASSAM; Patkoy Mts., *Griffith*.—DISTRIB. Java.

A tall, rambling herb. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in., finely serrate. *Peduncles* 1–2 in., often 1 from every axil, nearly to the ends of the branches. *Calyx-teeth* $\frac{1}{6}$–$\frac{1}{4}$ in., linear. *Corolla* green with purple marks, hairy within. *Anthers* 5, yellow; 2 surmounted by several bristles, 3 puberulous. *Berry* $\frac{1}{3}$–$\frac{1}{2}$ in., globose, black-purple. *Seeds* compressed, ellipsoid, smooth.

2. LOBELIA, *Linn.*

Herbs, often tall, or (non-Indian species) shrubs. *Leaves* alternate, toothed, rarely subentire. *Peduncles* axillary, 1-flowered, sometimes subracemose. *Calyx* superior, limb 5-partite. *Corolla* oblique, 2-lipped; upper lip 2-partite, lower 3-lobed. *Staminal tube* free or nearly so; anthers tipped with bristles, 3 upper naked. *Ovary* inferior, 2-celled; placentæ hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-teeth. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—Species 200, rare in Europe and W. Asia.

L. chenopodifolia, Wall. Cat. 1312 (*L. Cliffortiana*, Linn. Hort. Cliff. t. 2? ; DC. Prodr. vii. 372), cultivated from Roxburgh's time in the Calcutta Botanic Garden, is not indigenous in India.

SECT. I. **Holopogon,** *Benth. in Gen. Pl.* ii. 552 (char. narrowed to the Indian species). Small herbs. *Leaves* $\frac{1}{4}$–$1\frac{1}{2}$ in. *Corolla* small; lobes unequal. *Anthers* all barbate on the apex nearly equally.

† *Seeds distinctly trigonous.*

1. **L. trigona,** *Roxb. Fl. Ind.* i. 506; glabrous, leaves ovate subsessile, pedicels mostly longer than the leaves. *A. DC. Prodr.* vii. 359; *Wight Ic.* t. 1170; *H. f. & T. in Journ. Linn. Soc.* ii. 27, *partly*; *Dalz. & Gibs. Bomb. Fl.* 133, *excl. syn.* L. triangulata, *Roxb. Hort. Beng.* 16. L. stipularis, *Roth Nov. Sp.* 144; *Wall. Cat.* 1309. L. gratioloides, *Roxb.*; *A. DC. l. c.* 387. Lobelia sp., *Griff. Notul.* iv. 281.

The DECCAN and CEYLON, alt. 0–6000 ft., common. ASSAM, *Simons.* BENGAL; Dacca, *Clarke.* MERGUI, *Griffith*, n. 429. PEGU, *M'Lelland.*

Annual; branches 6–12 in., ascending, rooting only near the base, more or less 3-angled. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. diam., denticulate. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. *Capsule* $\frac{1}{6}$ by $\frac{1}{8}$ in., ellipsoid, not tapering acutely to the pedicel. *Seeds* ellipsoid, narrowed at both ends, distinctly trigonous.—Roth says that his *L. stipularis* was Heyne's *L. zeylanica*, of which the authentic examples, both at Kew and the British Museum, are *L. trigona*; and Wallich (Cat. 1309) agrees. But Roth's description of *L. stipularis* fits the Ceylon plant called below *L. zeylanica*, var. *Walkeri*; and it is quite possible that Heyne may have sent this to Roth. Benth. (Fl. Hongk. 196) unites with *L. trigona* (doubtingly) *L. chinensis*, Lour., which is its nearest ally, but has narrower leaves and more divaricate branches.

2. **L. affinis,** *Wall. Cat.* 1311; prostrate, often rooting, leaves petioled ovate minutely pilose on the nerves beneath, pedicels mostly longer than the leaves, calyx-teeth pilose. *A. DC. Prodr.* vii. 360; *Hook. f. & T. in Journ. Linn. Soc.* ii. 27. L. zeylanica, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 113; *Kurz in Journ. As. Soc.* 1877, ii. 211, *not of Linn.* L. subcuneata, *Miq. Fl. Ind. Bat.* ii. 574.

From SIKKIM, BENGAL and ASSAM to MALACCA and CEYLON; alt. 0–4000 ft., common.—DISTRIB. Malaya, S. China.

Stems 6–24 in., much branched, pubescent or glabrate, more or less 3-angled. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. diam., denticulate. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., not tapering to the pedicel. *Seeds* ellipsoid, narrowed at both ends, distinctly trigonous. —The Ceylon examples are *L. hirta*, Wight mss., and agree closely with the Javan; they are mixed by collectors with *L. zeylanica*, var. *Walkeri*, which they somewhat resemble; but the leaves are distinctly pubescent and seeds different.

VAR. *Lobbiana* (sp.), H. f. & T. in Journ. Linn. Soc. ii. 28; leaves 2 in., corolla $\frac{1}{2}$ in.—Khasia Mts., *Lobb.* The fragment on which this species is founded has the leaf hardly longer than in some examples of *L. affinis*, but the corolla is much larger, and may indicate a distinct species.

3. **L. terminalis,** *Clarke*; pubescent, ascending, leaves short-petioled ovate upper narrower sharply toothed almost bracteiform, pedicels very long slender.

NORTH BENGAL; near the foot of the hills; Bhyadanga in Mymensingh, *Clarke.*

A slender, suberect, annual, 6–10 in., branching, not rooting. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ in. diam., denticulate; upper oblong, incised. *Pedicels*, mostly from the upper axils, 3–5 times as long as the bractiform leaves, so that the inflorescence appears as a lax terminal corymb. *Corolla* $\frac{1}{6}$ in. *Capsule* $\frac{1}{6}$ by $\frac{1}{8}$ in., not tapering to the pedicel. *Seeds* subspherical, distinctly trigonous.

VAR. *minuta*; 1–2 in. high, leaves and flowers smaller.—Sikkim Terai; Phansidowa, *Clarke.* Both *L. terminalis* and its var. *minuta* have probably been passed by collectors for *Cephalostigma*, which they simulate closely.

4. **L. Griffithii,** *H. f. & T. in Journ. Linn. Soc.* ii. 28; glabrous, erect, leaves few small oblong sessile, pedicels longer than the leaves. *Kurz in Journ. As. Soc.* 1877, ii. 211. L. dopatrioides, *Kurz in Flora*, 1872, 302; *in Journ. As. Soc.* 1870, 77, *excl. syn. Griff.*

BIRMA; Mergui, *Griffith*; Tavoy, *Parish*; Martaban, *Brandis*; Arracan, *Kurz.*

Stems annual, 3–12 in., weak, thickened below, divided upwards, sparingly leafy or nearly naked. *Leaves* $\frac{1}{2}$ by $\frac{1}{6}$ in., entire or sparingly toothed. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in., nearly orbicular. *Seeds* ellipsoid, distinctly trigonous. Kurz's notes on this plant are misleading. He assumes from its locality that it must have been Griffith's n. 429 (Notul. iv. 281), and hence tries to make his diagnosis square with Griffith's description which refers to *L. trigona*, Roxb.

5. **L. microcarpa,** *Clarke*; glabrous, erect, leaves elliptic-oblong suborbicular sessile lower ovate upper linear, pedicels longer than the leaves, capsule small, calyx-teeth filiform.

TENASSERIM OR ANDAMANS; *Helfer* (Kew Distrib. n. 3447). MOULMEIN; *Lobb.* DISTRIB. Java.

Annual, 3–5 in. high, branching. Lower *leaves* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., crenate-dentate; upper leaves $\frac{1}{6}$ in., linear, bracteiform. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in. *Corolla* less than $\frac{1}{6}$ in. *Capsule* $\frac{1}{10}$ in., subspherical. *Seeds* subspherical, distinctly trigonous.—Near *L. chinensis*, Lour., which has a longer capsule with broader calyx-teeth, and the upper leaves much less reduced.

†† *Seeds ellipsoid, more or less compressed.*

6. **L. trialata,** *Ham. in Don Prodr.* 157; glabrous, stem suberect branched, leaves subsessile ovate or elliptic, pedicels mostly equalling the leaves, seeds obtuse compressed. *A. DC. Prodr.* vii. 360. L. micrantha, *Hook. Exot. Fl.* i. t. 44, *not of Kunth.* L. subincisa, *Wall. Cat.* 1310; *A. DC. l. c.* 367. L. arenarioides, *A. DC. l. c.* L. subracemosa, *Miq. Fl. Ind. Bat.* ii. 576. L. trigona, *H. f. & T. in Journ. Linn. Soc.* ii. 27, *partly*; *Kurz in Journ. As. Soc.* 1877, *pt.* ii. 211, *not of Roxb.* L. umbrosa, *Hochst.*; *Hemsl. in Oliv. Fl. Trop. Afr.* iii. 468. Rapuntium trialatum *and* arenarioides, *Presl Prodr. Lobel.* 13, 17.

NORTHERN INDIA; from Chumba and Bombay to Bhotan and Pegu, alt. 0–5000 ft., very common.—DISTRIB. Mts. of Ava, Java, Abyssinia.

Stems 6–15 in., trigonous, often trialate. *Leaves* $\frac{1}{4}$–1 in., subrhomboidal, narrowed at the base, the lower sometimes petioled, crenate or denticulate. *Corolla* $\frac{1}{6}$ in. *Capsule* $\frac{1}{5}$–$\frac{1}{3}$ in., much narrowed into the pedicel.—This has been much confused with *L. trigona*, Roxb., from which it essentially differs in the seeds: it can be generally recognised by the capsules being lanceolate-triangular (not ovate) at the base.

VAR. *lamiifolia*; leaves incise-dentate somewhat petioled.—Deccan, *Wight.*—This was marked *L. trialata* by Wight, and it appears to be a Deccan form of that species; but from the deeply incised leaves it looks very different and resembles the allied Tropical African species.

7. **L. zeylanica,** *Linn. Sp. Pl.* 1323, *not of Wall.*; stems elongate, leaves oblong or narrowly rhomboid narrowed at the base sessile subdecurrent, pedicels about as long as the leaves, seeds obtuse scarcely compressed. L. decurrens, *Roth Nov. Sp.* 145. L. Heyniana, *Roem. & Sch. Syst.* v. 50. L. dichotoma, *Miq. Fl. Ind. Bat.* ii. 576. L. trigona, *Thwaites Enum.* 169, *chiefly.* L. alata, *Heyne in Herb. Rottler.* L. Sebæ, *A. DC. Prodr.* viii. 386.

MALABAR; from Bombay to Travancore, CEYLON, apparently common.

Stems weak, usually elongate, 9–15 in., little branched, bialate or somewhat trigonous. *Leaves* $1\frac{1}{4}$ by $\frac{1}{3}$ in., denticulate or crenate. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in. *Capsule* $\frac{1}{5}$ by $\frac{1}{6}$ in., base not acute.—Linnæus' excellent specimen of this species is named *L. zeylanica* by his own hand; but the name has been altered (erroneously) by Sir J. E. Smith to *L. anceps*, an Australian species. The stems, leaves and calyx-teeth are glabrous or obscurely ciliate; but in a fine specimen collected by Beddome in Travancore, the leaves glisten with needle-like hairs beneath. A. DC. says that his *L. Sebæ*, from Ceylon, is not *L. zeylanica*, Linn.; but the picture (Seba Thes. t. 22, fig. 12), which is the only authority for the species, suits some of the examples of *L. zeylanica* as well as can be expected.

VAR. *Walkeri*; leaves petioled ovate glabrous.—Ceylon, *Walker, Wight.*—This looks distinct from *L. zeylanica*, but the flowers and seeds are exactly similar.

SECT. II. **Isolobus.** Small herbs. *Corolla* 2-lipped, lobes nearly equal in length. *Anthers* 5, 2 lower bearded on the apex, 3 upper naked.

8. **L. radicans,** *Thunb. in Trans. Linn. Soc.* ii. 330; procumbent, glabrous, leaves linear- or oblong-lanceolate remotely toothed or subentire, pedicels equalling or longer than the leaves. *Roxb. Hort. Beng.* 16, *and Fl. Ind.* i. 507; *Wall. Cat.* 1308. L. campanuloides, *Thunb. in Trans. Linn. Soc.* ii. 331. L. cæspitosa, *Blume Bijd.* 729; *A. DC. Prodr.* vii. 366. Rapuntium cæspitosum, radicans *and* campanuloides, *Presl Prodr. Lobel.* 13, 14. Isolobus campanuloides *and* radicans, *A. DC. l. c.* 353. I. Roxburghianus, *A. DC. l. c.* 353; *H. f. & T. in Journ. Linn. Soc.* ii. 27. Pratia radicans *and* Thunbergii, *G. Don Gen. Syst.* iii. 700.

KHASIA MTS; alt. 3–5000 ft.—DISTRIB. Java, S. China, Japan.

Leaves $\frac{1}{2}$–1 by $\frac{1}{10}$–$\frac{1}{4}$ in., sessile, often bifarious. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in., tube glabrous or

obscurely pubescent, green with pink marks, a green gland on each side the central lobe at its base. Two lower *filaments* hairy. *Capsule* ¼ by $\frac{1}{10}$ in., base acute. *Seeds* ellipsoid, slightly compressed.—The lobes of the corolla are subequal, but its structure differs in nowise from that of the section *Holopogon*, in which Benth. (in Gen. Pl. ii. 553) appears to include this species.

SECT. III. **Rhyncopetalum.** Tall, sometimes very tall, herbs. *Leaves* 2–12 in. *Flowers* in terminal racemes, the upper leaves reduced bracteiform. *Anthers* 5, 2 lower usually bearded, 3 upper usually naked.

* *Species of North India.*

9. **L. colorata,** *Wall. Pl. As. Rar.* ii. 42, *not of Sweet*; stem simple above or with a few long ascending branches, raceme lax rhachis subglabrous, cauline leaves linear-lanceolate glabrous beneath. *A. DC. Prodr.* vii. 380; *H. f. & T. in Journ. Linn. Soc.* ii. 28. L. purpurascens, *Wall. Cat.* 1307, *not of R. Br.* L. Wallichii, *Steud.* Rapuntium coloratum, *Presl Prodr. Lobel.* 24.

KHASIA MTS.; alt. 3–5500 ft., common.

Erect, 1–3 ft., nearly glabrous. Radical *leaves* elliptic, petioled, pilose above at least when young; cauline 4–5 by ½ in., narrowed at base, gland-crenulate, glabrous or nearly so. *Peduncles* ¼ in. nearly glabrous. *Calyx-teeth* sublinear, minutely gland-toothed, sometimes ⅓ in., sometimes even shorter than in the next species. *Corolla* ¾ in., purple, sometimes white. *Anthers* sparsely pilose on the backs, 2 lower bearded at the tips. *Capsule* ¼ in., subglobose, glabrous. *Seeds* ellipsoid, compressed, not margined.

10. **L. erecta,** *H. f. & T. in Journ. Linn. Soc.* ii. 28; stem simple above, leaves elliptic or oblong narrowed at both ends pubescent beneath on the nerves, raceme somewhat rigid, rhachis with many deflexed white hairs.

ALPINE SIKKIM; alt. 10–12,000 ft., *J. D. H.*, *C. B. Clarke.*

Stem 1–3 ft., always simple, somewhat rigid. *Leaves* 4 by 1½ in., subpetioled, obscurely crenate-toothed. *Peduncles* ¼ in., hairy. *Calyx-teeth* ⅓ in., linear-lanceolate, minutely gland-toothed. *Corolla* ½–¾ in., purple. *Anthers* obscurely pilose on the backs, 2 lower bearded at the tips. *Capsule* ⅓ in., subglobose, pilose or finally glabrescent. *Seeds* ellipsoid, compressed, not margined.—Closely allied to *L. colorata.*

11. **L. mishmica,** *Clarke*; stem much branched upwards, upper leaves elliptic subpetioled pilose on both surfaces, racemes elongate leafy pilose. Lobelia sp., *Griff. Journ.* 39.

MISHMI MTS.; at Premsong's, *Griffith* (Kew Distrib. n. 3446).

Inflorescence (the only part seen) 15 in., much paniculately branched, branches long-racemed with capsules. *Leaves* (of inflorescence alone seen) 1 by ½–¾ in., obscurely crenate-dentate (the lower were doubtless much larger). *Peduncles* ¼ in., hairy. *Calyx-teeth* ¼–⅓ in., linear-lanceolate, minutely gland-toothed. *Corolla* purple-red (Griffith). *Capsule* ¼ in., subglobose, hairy. *Seeds* ellipsoid, somewhat compressed, minute, not margined.—The material is imperfect, but evidently represents a new species.

12. **L. pyramidalis,** *Wall. in As. Research.* xiii. 376; stem widely branched upwards glabrous, leaves linear-lanceolate finely serrulate glabrous above, racemes many-flowered dense upwards. *Wall. Cat.* 1302, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 113; *Don Prodr.* 157; *Bot. Mag.* t. 2387; *A. DC. Prodr.* vii. 381; *H. f. & T. in Journ. Linn. Soc.* ii. 29. L. Wallichiana, *H. f. & T. in Journ. Linn. Soc.* ii. 29; *Kurz in Journ. As. Soc.* 1877, *pt.* ii. 211. Rapuntium pyramidale *and* Wallichianum, *Presl Prodr. Lobel.* 23, 24.

HIMALAYA; common from Gurwhal, eastward, alt. 3–9000 ft.; KHASIA MTS. and PEGU.—DISTRIB. N. Birma, S. China.

Stem 2–7 ft. *Leaves* 6 by $1\frac{1}{2}$ in., upper sessile, beneath glabrous or pubescent on the nerves. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in., glabrous or shortly pubescent. *Calyx-teeth* $\frac{1}{2}$–$\frac{3}{4}$ in., linear, glabrous or pubescent. *Corolla* $\frac{3}{4}$–1 in., purple-rose, sometimes nearly white. *Anthers* pilose on the back, rarely nearly glabrous, 2 lower usually with 1 or more bristles on the tips. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., subglobose, glabrous or pubescent. *Seeds* ellipsoid, compressed, margined on one side.

13. **L. rosea,** *Wall. Pl. As. Rar.* ii. 42, t. 152; stem with horizontal branches upwards softly pilose, leaves narrowly lanceolate velvety above, peduncles crowded racemose scarcely longer than the capsules. *Wall. Cat.* 1303, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 115; *A. DC. Prodr.* vii. 381; *H. f. & T. in Journ. Linn. Soc.* ii. 29, *excl. syn.*; *Kurz in Journ. As. Soc.* 1877, ii. 212.

SUBTROPICAL HIMALAYA; from Kumaon to Bhotan and the KHASIA MTS., alt. 0–4000 ft., abundant in the Terai of North Bengal and Assam. MARTABAN, *Kurz.*—DISTRIB. Ava.

Stem 4–12 ft., suberect, branches short, horizontal with drooping tips; flowers crowded. *Leaves* 6 by 1 in., narrowed at both ends, subsessile, minutely toothed. *Peduncles* $\frac{1}{4}$ in., rarely $\frac{1}{2}$ in., softly pilose, often recurved. *Calyx-tube* pilose, teeth linear minutely toothed. *Corolla* $\frac{3}{4}$ in., rose or white. *Anthers* usually very hairy on the backs, tips of 2 lower bearded. *Capsule* $\frac{1}{3}$ in. diam., subglobose. *Seeds* ellipsoid, compressed, not (or most obscurely) margined.—The Deccan plants formerly referred here have the leaves glabrous above, the peduncles 2–4 times as long as the capsules.

** *Species of the Deccan Peninsula and Ceylon.*

14. **L. nicotianæfolia,** *Heyne in Roth Nov. Sp.* 143; stem tall usually branched upwards somewhat pubescent or glabrate, leaves lanceolate sparingly pilose or glabrescent, anthers glabrous on the back rarely a little hairy. *Wall. Cat.* 1304, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 110; *A. DC. Prodr.* vii. 381; *Wight Ill.* t. 135; *Dalz. & Gibs. Bomb. Fl.* 133; *H. f. & T. in Journ. Linn. Soc.* ii. 29. Rapuntium nicotianæfolium, *Presl Prodr. Lobel.* 24.

MALABAR; on the Ghats, alt. 3–7000 ft., from Bombay to Travancore, frequent, and in Ceylon.

Stem 5–12 ft., erect, thick, hollow below, usually branched at the top or the inflorescence compound, glabrescent below, more or less pilose upwards. *Leaves* narrowly obovate-lanceolate, lower often 12 by 2 in., upper gradually smaller, subsessile, serrulate, herbaceous, glabrous or nearly so above, pilose or glabrous beneath. *Racemes* dense, more or less pubescent; peduncles $\frac{1}{2}$–1 in. and upwards. *Calyx-tube* glabrous or pubescent; teeth $\frac{1}{3}$ in., linear, gland-denticulate. *Corolla* $\frac{3}{4}$–$1\frac{1}{4}$ in., glabrous or pubescent. *Capsule* $\frac{1}{3}$ in. diam., subglobose. *Seeds* ellipsoid, compressed, not margined.

VAR. *trichandra*; anthers with many white hairs spreading from their backs. L. trichandra, *Wight Ic.* t. 1171.—Nilgherry Mts., *Wight.*—Usually more slender, more glabrous, and with thinner racemes than *L. nicotianæfolia*; but Wight could not distinguish it, still less can Thwaites, who (Enum. Pl. Zeyl. 170) further unites *L. excelsa.*

15. **L. excelsa,** *Leschen.*; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 114, *not of Bonpl.*; stem tall usually simple softly villous upwards, leaves lanceolate villous rugose, spike dense, anthers usually glabrous on the back. *Wall. Cat.* 1305, *and Pl. As. Rar.* ii. 42; *A. DC. Prodr.* vii. 381; *Wight Ic.* tt. 1173–4; *H. f. & T. in Journ. Linn. Soc.* ii. 29. L. aromatica, *Moon Cat. Pl. Ceyl.* 14; *Wight. Ic.* t. 1172; *H. f. & T. in Journ. Linn. Soc.* ii. 29. Rapuntium Leschenaultianum, *Presl Prodr. Lobel.* 24.

Mts. of SOUTHERN INDIA and CEYLON; alt. 3–8000 ft., common.

Very near *L. nicotianæfolia,* and regarded as a form of it by Thwaites. From the biennial dense tuft of radical leaves a foot long rises the stout coarse flowering stem,

often 15 ft. long, ending in a dense hairy spike, usually simple, though sometimes divided. The leaves are thicker, more villous than those of *L. nicotianæfolia*, the corolla often very hairy without. The milk of both species is intensely acrid.

DOUBTFUL SPECIES.

16. L. ? PUMILA, *A. DC. Prodr.* vii. 360; founded entirely on *Burm. Fl. Ind.* 186, t. 60, fig. 3, a small Lobelia-like plant, from Coromandel, but with opposite lanceolate leaves.

3. CEPHALOSTIGMA, *A. DC.*

Small, erect, branched herbs, sparsely patently hairy. *Leaves* alternate, subsessile, margin thickened entire waved or crisped. *Flowers* small, racemed or panicled; upper bracts often very small and pedicels filiform. *Calyx* superior; limb 5-partite. *Corolla* deeply 5-fid; segments linear-lanceolate, spreading stellately, blue or whitish. *Ovary* subglobose, 2–3-celled. *Style* cylindric; stigma shortly obtusely 3-lobed. *Capsule* loculicidally 2–3-valved within the persistent calyx-teeth. *Seeds* very many, small, ellipsoid, compressed or trigonous.—Species 9, 5 Indian, 3 Tropical African, 1 Brazilian.

* *Seeds oblong-ellipsoid, compressed, not trigonous.*

1. **C. Schimperi,** *Hochst.*; *A. Rich. Fl. Abyss.* ii. 2: stem erect with numerous horizontal branches above, leaves oblong and elliptic acute margins undulate crisped recurved. C. hirsutum, *H. f. & T. in Journ. Linn. Soc.* ii. 9, *partly*; *Dalz. & Gibs. Bomb. Fl.* 133; *Vatke in Linnæa*, xxxviii. (1874), 699; *Hemsl. in Oliver Fl. Trop. Afr.* iii. 472, *not of Edgew.* Wahlenbergia perotifolia, *W. & A. Prodr.* 405; *A. DC. Prodr.* vii. 434; *Wight Ic.* t. 842. Dentella erecta, *Roth Nov. Sp.* 140.

Throughout the DECCAN; from Ceylon to Rajpootana and Chota Nagpore; common. KHASIA and JAINTEA; alt. 2–5000 ft., common. CEYLON.—DISTRIB. E. Africa.

Erect 4–15 in., patently pilose, the main stem simple nearly to the top of the plant. *Leaves* $\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., narrowed at both ends, subsessile, sparsely patently pilose or glabrescent. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in., rarely longer. *Calyx-tube* patently pilose, lobes $\frac{1}{12}$ in., linear-lanceolate, nearly glabrous. *Corolla* $\frac{1}{8}$ in., bluish. *Capsule* $\frac{1}{10}$ in. diam., subglobose or obovoid. *Seeds* much longer than broad.

2. **C. flexuosum,** *H. f. & T. in Journ. Linn. Soc.* ii. 9: stem erect flexuose repeatedly dichotomous with ascending branches, leaves sessile ovate and elliptic narrowed at both ends subobtuse thin. *Dalz. & Gibs. Bomb. Fl.* 133.

MALABAR; Concan, *Dalzell, Stocks.* Bababoodun hills, *Law.*

Very closely allied to *C. Schimperi*, but instead of the rigid crisped habit, it is flexuose with thin leaves and much longer capillary pedicels, as though it were *C. Schimperi* growing in a moist shady place; calyx-teeth larger, $\frac{1}{6}$–$\frac{1}{8}$ in.

** *Seeds trigonous.*

3. **C. paniculatum,** *A. DC. Prodr.* vii. 421; stem repeatedly dividing upwards, leaves oblong narrowed at both ends, panicles loose, pedicels capillary, calyx glabrous, teeth linear. *H. f. & T. in Journ. Linn. Soc.* ii. 9; *Kurz in Journ. As. Soc.* 1877, *pt.* ii. 210. Campanula paniculata, *Wall. Cat.* 1295 A. B.

BIRMA; Prome, *Wallich.*

Stem 15 in., sparsely pubescent. *Leaves* 2 by $\frac{2}{3}$ in., sessile, obscurely crenate, nearly glabrous. *Panicle* nearly naked; upper bracts linear, minute. *Calyx-teeth* $\frac{1}{8}$ in. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in., bright blue. *Capsule* $\frac{1}{8}$ in., shortly obconic, valves forming a cone as long as the inferior portion of the capsule. *Seeds* lanceolate-ellipsoid, distinctly trigonous.

4. **C. hirsutum,** *Edgew. in Trans. Linn. Soc.* xx. 81; stem erect divided upwards, leaves elliptic narrowed at both ends, calyx patently pilose, teeth lanceolate-linear. *H. f. & T. in Journ. Linn. Soc.* ii. 9, *in part, excl. all syn.* C. anagalloides, *Royle Ill.* 253, *name only.* C. paniculata, *Wall. Cat.* 1295 C.

WESTERN HIMALAYA; alt. 2–5000 ft., from Kashmir to Kumaon, frequent, *Falconer, Edgeworth,* &c. BEHAR; Parasnath, alt. 4000 ft., *J. D. H., Kurz.*

Stem 1–5 in., somewhat rigid, patently pilose, the branches ascending. *Leaves* $\frac{1}{3}$–1 by $\frac{1}{6}$–$\frac{1}{4}$ in., margin crisped waved or subcrenulate, patently pilose. *Panicle* small; upper bracts very small; pedicels $\frac{1}{6}$–$\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{10}$ in., pilose. *Corolla* $\frac{1}{8}$ in., blue. *Capsule* $\frac{1}{10}$ in. diam., subglobose. *Seeds* shortly ellipsoid, trigonous.—A much smaller, more rigid and hairy plant than *C. paniculatum,* with smaller flowers; but perhaps not specifically distinct. It is readily separated from *C. Schimperi* by the seeds, which Kurz could not have compared when he suggested (*Journ. As. Soc.* 1877, pt. ii. 210) that H. f. & T. were in error. Wallich's n. 1295 C. was not collected in Birma with the rest of n. 1295, but came from Herb. Wight.

5. **C. Hookeri,** *Clarke*; stem erect dichotomously branched upwards, leaves elliptic narrowed at both ends, calyx-teeth shortly triangular glabrous. Cephalostigma nov. sp., *Herb. Ind. Or. H. f. & T.*

BEHAR; Parasnath, alt. 4000 ft., *J. D. H., Clarke, Watt.* KHASIA MTS.; from the Garos to the Nagas, alt. 4000 ft., very common.

Stem 3–8 in., patently pilose. *Leaves* $\frac{3}{4}$–$\frac{1}{3}$ in., hardly acute, often minutely crenate, sometimes subpetioled, sparsely pilose. *Panicles* terminal, often nearly naked; bracts most minute, linear. *Calyx* nearly glabrous; teeth $\frac{1}{16}$ in. long. *Corolla* $\frac{1}{10}$ in., blue. *Capsule* $\frac{1}{10}$ in. diam., subglobose. *Seeds* shortly ellipsoid.—The Parasnath examples have the stem erect, simple, with some larger leaves clustered almost in a whorl at the base of the panicle. The Khasian examples have the stem stouter, flexuose, more hairy, branched from the base, and the leaves have no tendency to a whorl.

4. WAHLENBERGIA, *Schrad.*

Annual or perennial herbs. *Leaves* alternate or opposite. *Peduncles* terminal or leaf-opposed, panicled. *Calyx* superior, limb 5-partite. *Corolla* campanulate, 5-lobed, sometimes to the base. *Stamens* free from the corolla; filaments often dilated near the base; anthers oblong, free. *Ovary* turbinate, 2–3-celled. *Style* cylindric; stigma (in the Indian species) of 3 narrow lobes. *Capsule* erect, 2–3-celled, loculicidally 2-3 valved within the persistent calyx-teeth. *Seeds* very many, small.—DISTRIB. Species 80, chiefly in the southern hemisphere, a few tropical, 1 European.

1. **W. gracilis,** *DC. Prodr.* vii. 433, *not of E. Meyer*; leaves from linear to obovate-oblong more or less toothed, peduncles terminal subpanicled, calyx-teeth short linear erect in fruit. *Kurz in Journ. As. Soc.* 1877, *pt.* ii. 209. W. agrestis, *A. DC. Prodr.* vii. 434; *Wight Ic.* t. 1175; *H. f. & T. in Journ. Linn. Soc.* ii. 21; *Dalz. & Gibs. Bomb. Fl.* 134. W. indica, *A. DC. l. c.*; *Wight Ic.* t. 1176. W. dehiscens, Sieberi, marginata, lavandulæfolia *and* quadrifida, *A. DC. Prodr.* vii. 433, 434. Campanula agrestis, *Wall. Cat.* 1292, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 97. C. dehiscens, *Roxb. Hort. Beng.* 85, *and Fl. Ind.* i. 504; *Wall. Cat.* 1294, *and in As. Research.* xii. 571, *with fig.* C. marginata, *Thunb. Fl. Jap.* 89, *and Pl. Jap. Dec.* iii. *Ic.* 4. C. lavandulæfolia, *Reinw. in Blume Bijd.* 725. Lightfootia gracilis, *Miq. Fl. Ind. Bat.* ii. 567.

Throughout INDIA; alt. 0–7000 ft., a common weed.—DISTRIB. E. Asia, Australia, New Zealand, S. Africa.

Erect or decumbent, simple or divaricately, branched from the base, 4–24 in. high, glabrous or hairy, or more hairy below, glabrous above. *Leaves* $\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{2}$ in., margin often thickened or undulate. *Peduncles* 1–8 in., glabrous or nearly so; upper bracts linear, small. *Calyx-teeth* $\frac{1}{12}$–$\frac{1}{6}$ in., linear from a triangular base, glabrous.

Corolla 1/6–2/3 in., campanulate, deeply divided into broad oblong lobes, blue. *Capsule* 1/4 in., tapering into the peduncle. *Seeds* ellipsoid, compressed, sublenticular, smooth. —*W. agrestis* is nearly glabrous with linear leaves; *W. indica* has even the uppermost leaves very hairy; *W. dehiscens* is a weak small annual with broad obovate petioled thin leaves; *W. marginata* has the leaves with white thickened margins and a rigid habit. Some examples (in flower) are of the first year; other examples have a very woody base whence spring numerous annual shoots.

2. **W. peduncularis,** *H. f. & T. in Journ. Linn. Soc.* ii. 22; glabrous, leaves elliptic subentire, peduncles solitary axillary leaf-opposed, calyx-teeth oblong herbaceous lax in fruit. Campanula? peduncularis, *Wall. Cat.* 7139; *A. DC. Prodr.* vii. 483.

KUMAON; *Blinkworth*; Chaur, alt. 6700 ft., *Strachey & Winterbottom.*

Stems 3–8 in., weak, little divided. *Leaves* opposite or (especially the upper) alternate, 1/3–1/2 by 1/4 in., shortly petioled. *Peduncles* 1/2–2 in. *Corolla* 1/3 in., divided nearly to the base into narrow-oblong segments. *Filaments* dilated, pilose below. *Stigmas* 3, linear-oblong. *Capsule* 1/6 in., tapering into the peduncle. *Calyx-teeth* 1/8–1/6 in., oblong from a triangular base. *Seeds* ellipsoid, slightly compressed, smooth.—The leaves beneath and the calyx-tube are somewhat glaucous.

3. **W. ? dicentrifolia,** *Clarke*; glabrous, leaves ovate subentire, peduncles terminal, calyx-teeth linear erect on the fruit.

SIKKIM; Phulloot, alt. 11,000 ft., *Clarke.*

Erect, 1 ft., much and patently branched. *Leaves* 1/3–1/2 in. diam., glaucous beneath; petiole 1/8 in. *Peduncles* 1 in., thickened upwards in fruit. *Calyx-teeth* 1/4–1/3 by 1/10 in. *Stamens* 5, free; filaments dilated at the base. *Capsule* 1/2 by 1/3 in., horizontal or cernuous, elongate-obconic, tapering into the peduncle, 3-celled, prominently 10-ribbed; conical superior beak 1/4 in., loculicidally 3-valved. *Seeds* oblong-ellipsoid much compressed, without a trace of the reticulation of the testa seen in *Codonopsis.*—The examples are good, but in late fruit; the corolla appears to have been lobed nearly to the base. The species is exceedingly like *Codonopsis thalictrifolia*, Wall., and the long superior conical beak of the capsule also is very like *Codonopsis*, but the elongate obconic capsule and the seeds are very different.

5. LEPTOCODON, *H. f. & T.* (*not of Sond.*).

A slender, glabrous twiner. *Leaves* alternate and opposite, long-petioled, ovate, membranous. *Peduncles* terminal and leaf-opposed, slender, 1-flowered. *Calyx* 1/2-inferior; limb 5-lobed to the base. *Corolla* tubular, curved, inflated upwards, truncate, shortly 5-lobed, blue. *Stamens* 5, free from the corolla, alternate with 5 clavate epigynous glands; filaments dilated at the base; anthers oblong, free. *Ovary* 1/2-inferior, obconic, 3-celled, conical upwards. *Style* long, cylindric; stigma ovate, hairy, of 3 suberect oblong lobes. *Capsule* a double cone; the upper free cone elongate, loculicidally 3-valved. *Seeds* few, oblong-ellipsoid, somewhat compressed, smooth, shining black.

1. **L. gracilis,** *H. f. & T. in Journ. Linn. Soc.* ii. 17. Codonopsis gracilis, *Hook. f. Ill. Him. Pl.* t. 16, fig. A.

SIKKIM; Lachen and Lachoong, alt. 6–9000 ft., *J. D. H.*

Leaves 1/2–3/4 in. diam., undulate-crenate; petiole 1/2–1 in. *Calyx-lobes* 1/6 in., linear-oblong, herbaceous. *Corolla* 1–1½ in., mouth 1/2–3/4 in. diam. *Capsule* 3/4 by 1/4 in.; the superior portion longer than the inferior.

6. CODONOPSIS, *Wall.*

Perennial herbs; twiners from a tuberous root, or suberect from a fibrous root. *Leaves* alternate or subopposite, petioled. *Peduncles* axillary or terminal, 1-flowered. *Flowers* conspicuous, green, blue, yellowish or lurid, often purple-

veined, 5- rarely 4–6-merous. *Calyx* superior; lobes 5, long, foliaceous. *Corolla* campanulate, shortly 5-lobed. *Stamens* 5, free, inserted on the margin of an epigynous disc; filaments somewhat dilated at the base; anthers oblong, free. *Ovary* at first inferior, turbinate, with a short conic superior vertex, 3-celled; style cylindric, stigma of 3 ovate or oblong lobes. *Capsule* somewhat fleshy, ultimately dry; beak elongated in fruit, loculicidally 3-valved. *Seeds* very many, small, ellipsoid, slightly compressed, smooth, brown.—Species 12, in the Himalaya, Yunan, Mantschuria, and Japan.

In the Genera Plantarum the ovary and stigma-lobes are described as sometimes 5–4, of which no instances have been found in the Indian species.

1. **C. viridis,** *Wall. Cat.* 1298, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 103; stem twining, leaves elliptic-oblong from a rhomboidal or truncate base densely pilose beneath, peduncles axillary minutely puberous, calyx-teeth distant linear, corolla in bud densely pilose. *H. f. & T. in Journ. Linn. Soc.* ii. 12. Wahlenbergia viridis, *A. DC. Prodr.* vii. 424. Campanula viridis, *Spreng. Cura post.* 78.

NIPAL and KUMAON, alt. 7000 ft., *Wallich*, &c.

Leaves 2–3 by $\frac{3}{4}$–$1\frac{1}{2}$ in., opposite and alternate, base obtuse or slightly rounded but not cordate, subentire, minutely pilose above, at least when young; petiole $\frac{1}{2}$ in. *Peduncles* 2 in. *Calyx-teeth* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{8}$ in., not (or very obscurely) widened upwards, pilose on both surfaces. *Corolla* 1 by $\frac{3}{4}$ in., lurid yellow. *Capsule* hemispheric, $\frac{1}{2}$–$\frac{3}{4}$ in. broad; beak $\frac{1}{4}$ in. long. *Testa* with very small and obscure reticulations, even under the microscope, so that the seed does not "glisten" under an ordinary pocket-lens.

2. **C. Griffithii,** *Clarke*; stem twining, leaves elliptic-oblong from a rhomboidal or truncate base densely pilose beneath, calyx-teeth distant linear broader upwards, peduncles axillary patently pubescent, corolla in bud glaucous. Codonopsis sp. 3, *Griff. Notul.* iv. 281, *Ic. Pl. Asiat.* t. 482.

KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c.

Altogether resembling *C. viridis*, under which it is included by H. f. & T., and of which it may be a geographic variety. The leaves are more hairy, the petioles have crisped or patent hairs, while the young corolla without is glabrous or with a few long white hairs near the top; the testa is much more coarsely and prominently reticulate, so that the seeds glisten under a pocket-lens.

3. **C. affinis,** *H. f. & T. in Journ. Linn. Soc.* ii. 12; stem twining, leaves ovate-oblong from a deeply cordate base villous beneath, peduncles axillary and terminal, calyx-teeth distant narrowly oblong.

SIKKIM HIMALAYA, alt. 11,000 ft., *J. D. H.*, *Clarke.*

Leaves 2–4 by 1–$2\frac{1}{2}$ in., opposite and alternate, subentire, sparsely pilose above, at least when young; petiole $\frac{1}{2}$–2 in. *Peduncles* 1–5 in., often dichotomous with a bractiform leaf, so that the inflorescence appears of few-flowered racemes. *Calyx-teeth* $\frac{1}{3}$ by $\frac{1}{8}$ in., narrower upwards, pilose on both surfaces. *Corolla* $\frac{3}{4}$ in. long and broad, green with purple marks. *Capsule* hemispheric, $\frac{1}{2}$ in. broad; beak $\frac{1}{6}$ in. long. *Seeds* not glistening under the lens, i.e. the reticulations of the testa are very small, not prominent.

VAR. *birmanica*; leaves sparsely pilose beneath, calyx-lobes elliptic-acute.—Birma, *Griffith* (Kew Distrib. n. 3439).—An imperfect fruiting example, referred by H. f. & T. doubtfully to *C. affinis*, which the calyx-lobes hardly admit. It is probably a new species.

4. **C. purpurea,** *Wall. Cat.* 1299, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 105; glabrous, stem diffuse, leaves opposite elliptic-oblong subentire base rhomboid or truncate, peduncles axillary and terminal, calyx-teeth approximate

triangular ovate. *H. f. & T. in Journ. Linn. Soc.* ii. 12. Wahlenbergia purpurea, *A. DC. Prodr.* vii. 425. Campanula purpurea, *Spreng. Cura post.* 78.

NIPAL; Gossain-than, *Wallich.* KUMAON; Lohulhat, alt. 6000 ft., *Strachey & Winterbottom.*

Rambling or subscandent, not twining. *Leaves* 2½ by 1–1½ in., all opposite or peduncle-opposed, sometimes obscurely rounded at the base, never cordate, glaucous beneath; petiole ¼ in. *Peduncles* ½–2 in. *Calyx-teeth* ⅓ by ⅙ in., subacute, glaucous. *Corolla* 1 by ¾ in., purple. *Capsule* obconic or subhemispheric, ⅓ in. broad; beak ¼ in. long. *Seeds* not glistening, i.e. testa very minutely reticulated.

5. **C. rotundifolia,** *Benth. in Royle Ill.* 254, t. 62; stem twining, leaves ovate from a rounded base crenate glabrous or sparsely pilose, calyx-teeth approximate elliptic, corolla widely campanulate, seeds $\frac{1}{16}$ in. oblong-ellipsoid. *Bot. Mag.* tt. 4942, 5018; *H. f. & T. in Journ. Linn. Soc.* ii. 14. Wahlenbergia rotundifolia, *A. DC. Prodr.* vii. 425.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 7–11,000 ft., common.

Leaves alternate, often 2 by ¼ in., very variable in size; petiole ⅝ in. *Peduncles* 1–6 in., axillary and terminal. *Calyx-lobes* ¾ by ¼–⅓ in., often crenate or toothed. *Corolla* ¾–1¼ by ¾ in., purple or lurid grey-blue. *Capsule* hemispheric, ½–¾ in. broad; beak ¼ in. *Seeds* minutely reticulate, not glistening, more than twice as large as those of *C. Benthami* and its allies.

6. **C. Benthami,** *H. f. & T. in Journ. Linn. Soc.* ii. 14; rambling or subscandent, leaves rhomboid-elliptic crenate pilose on both surfaces, calyx-teeth approximate ovate acute, corolla narrowly campanulate somewhat constricted in the middle, seeds short ellipsoid scarcely $\frac{1}{30}$ in. long.

SIKKIM HIMALAYA; Lachen, alt. 9000–11,000 ft., *J. D. H.*; Yakla, alt. 11,000 ft., *Clarke.*

Not twining. *Leaves* nearly as of *C. rotundifolia*, but less rounded at the base. *Corolla* ¾–1 by ½ in., lurid purple-yellow. *Capsule* hemispheric, ⅓–½ in. broad; beak nearly ¼ in. long. *Seeds* not glistening.—Separable from *C. rotundifolia* by the more woody, rambling, but not twining, stem, and by the seeds, which are less than ⅙th the volume.

7. **C. subsimplex,** *H. f. & T. in Journ. Linn. Soc.* ii. 16; suberect, leaves ovate from a rounded base crenate sparsely pilose, calyx-lobes approximate ovate, corolla broadly campanulate, seeds $\frac{1}{24}$ in. ellipsoid.

ALPINE SIKKIM; Lachen and Yeumtung, alt. 12–13,000 ft., *J. D. H.*; ridge between Sikkim and Nipal, alt. 11,000 ft., *Clarke.*

Stem 1–2 ft., branched. *Leaves* 1¼–2 by ¾–1 in., alternate and opposite, closely resembling those of *C. rotundifolia*; petiole ½ in. *Peduncles* 1–4 in., terminal. *Calyx-lobes* ½ by ¼–⅓ in., entire or slightly toothed. *Corolla* ¾ in. long and nearly as broad, lurid pale-blue. *Capsule* hemispheric, ⅓ in. broad; beak ⅙–¼ in. long. *Seeds* not glistening, about ⅓ the volume of those of *C. rotundifolia*, twice as large as those of *C. Benthami.*—This differs from *C. Benthami* chiefly by the shorter much broader corolla.

8. **C. thalictrifolia,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 106; leaves small ovate or reniform pilose, peduncles long, calyx-lobes oblong, corolla narrow tubular with a widened mouth. *Benth. in Royle Ill.* 253; *H. f. & T. in Journ. Linn. Soc.* ii. 16. Glossocomia thalictrifolia, *Wall. Cat.* 1297. G. tenera, *Don Prodr.* 158. Wahlenbergia thalictrifolia, *DC. Prodr.* vii. 425. Campanula thalictrifolia, *Spreng. Cura post.* 77.

NIPAL; Gossain Than, *Wallich.*

Stems flexuose. *Leaves* ⅙–¼ in. diam., alternate and opposite, subentire, pilose on both surfaces; petiole ⅛ in. *Peduncles* 2–6 in., terminal, laxly pubescent or glabrous.

Calyx-lobes $\frac{1}{4}$ by $\frac{1}{10}$ in., somewhat distant, minutely pubescent. *Corolla* 1 in. long, tube $\frac{1}{4}$ in. diam., mouth $\frac{1}{2}$ in. diam. *Capsule* subhemispheric.—This should perhaps be removed to *Leptocodon.*

9. **C. fœtens,** *H. f. & T. in Journ. Linn. Soc.* ii. 16; leaves small ovate or reniform pilose, peduncles long, calyx-lobes elliptic-oblong, corolla globose-campanulate.

ALPINE SIKKIM; Samdong, Lachen, and Kangra Lama, alt. 14–16,000 ft., *J. D. H.*

Closely resembling *C. thalictrifolia* except as to the corolla. *Stems* 6 in., flexuose. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Peduncles* 3–6 in., terminal. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{6}$ in., approximate at base, minutely pilose. *Corolla* 1 by $\frac{3}{4}$ in. *Capsule* depressed obconic, $\frac{1}{3}$ in. broad; beak nearly $\frac{1}{2}$ in. long, more than double the length of the portion of the capsule below it. *Seeds* ellipsoid, not glistening.—Separated doubtingly from *C. thalictrifolia* by H. f. & T., but the corolla is very different, and the calyx-teeth much broader at the base. It scarcely differs from *C. ovata* by the smaller leaves, more globose corolla (which from the dried example seems to have been lurid purple, not sky-blue), and smaller seeds.

10. **C. ovata,** *Benth. in Royle Ill.* 253, t. 69, fig. 3; leaves ovate hairy on both surfaces, peduncles long, calyx-lobes elliptic-oblong, corolla broadly campanulate, seeds narrowly ellipsoid $\frac{1}{16}$ in. long. *Lindl. in Gard. Chron.* 1856, 468, *with fig.*; *H. f. & T. in Journ. Linn. Soc.* ii. 15. Wahlenbergia Roylei, *DC. Prodr.* vii. 425.

WESTERN HIMALAYA; from Kashmir to Gurwhal, alt. 8–12,000 ft., common.

Root woody, fusiform, large. *Stem* 6–12 in., decumbent, then erect. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{6}$–$\frac{1}{2}$ in., alternate and opposite, obtuse or acute; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Peduncles* 3–6 in., terminal. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{6}$ in., approximate at base, minutely pilose. *Corolla* 1–1$\frac{1}{4}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., widened upwards, sky-blue. *Capsule* depressed obconic, $\frac{1}{3}$–$\frac{1}{2}$ in. broad; beak $\frac{1}{3}$ in. long. *Seeds* much longer than those of *C. fœtens*, not glistening.—*C. clematidea*, Schrenck (*Glossocomia clematidea*, Fisch. in Regel Gartenfl. 1856, 226, t. 167, fig. 2), has larger, subglabrous leaves, but is probably only a form of *C. ovata.*

7. **CYANANTHUS,** *Wall.*

Annual or perennial herbs. *Leaves* alternate, entire or lobed. *Flowers* terminal, blue, peduncled or sessile. *Calyx* nearly inferior, usually shaggy when young; tube ovate or cylindric; lobes 5, lanceolate or triangular. *Corolla* tubular or funnel-shaped; lobes 5, induplicate-valvate. *Stamens* free from the corolla; anthers ovate, adpressed round the base of the style, free or coherent. *Ovary* nearly superior, conoid, tapering upwards, 3-5-celled; style cylindric from a conic base, stigma 3–5-lobed lobes short, soon recurved. *Capsule* nearly or quite included in the persistent calyx-tube, ovoid-conoid, loculicidally 5–4-(rarely 3-) valved from the apex. *Seeds* minute, narrowly oblong-ellipsoid or shortly ellipsoid, smooth, brown; testa not (or most obscurely) reticulated.—Species 7, all Himalayan.

* *Root perennial; stems subsimple, 1-flowered, the lateral branches few, weak, not flowering.*

1. **C. lobatus,** *Wall. Cat.* 1473; leaves subpetioled obovate-oblong lobed often 3-fingered sparingly pilose, peduncles solitary and calyx with black spreading hairs. *Benth. in Royle Ill.* 309, t. 69, fig. 1; *Bot. Reg.* 1847, t. 6; *Regel Gartenfl.* 1877, t. 888; *H. f. & T. in Journ. Linn. Soc.* ii. 19; *Bot. Mag.* t. 6485.

ALPINE HIMALAYA; from Gurwhal to Sikkim, alt. 11–14,000 ft., common.

Stems 4–16 in., somewhat stout, glabrous below, hirsute upwards, simple or with

a few short weak branches near the base. *Leaves* $\frac{3}{4}$–1 by $\frac{1}{3}$ in., laxly pilose, ultimately nearly glabrous. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in., ovate, lobed subacutely $\frac{1}{3}$ its length. *Corolla* sometimes 1½ by 1 in. diam. at the mouth (usually much smaller), tubular-funnel-shaped; lobes ovate, somewhat spreading, hairy at least in the throat. *Capsule* $\frac{1}{2}$ in., ovoid-conoid, superior for $\frac{5}{6}$ its length; calyx in fruit unaltered, densely black hirsute. *Seeds* $\frac{1}{12}$ in., narrowly oblong-ellipsoid.

2. **C. integer,** *Wall. Cat.* 1472; leaves subsessile entire or crenate-toothed broadly or narrowly oblong shortly closely scabrid-pilose on both surfaces, flowers subsessile, calyx black-hirsute unaltered in fruit. *Benth. in Royle Ill.* 309, t. 69, fig. 2; *H. f. & T. in Journ. Linn. Soc.* ii. 19. C. barbatus, *Edgew. in Trans. Linn. Soc.* xx. 82.

KUMAON, *Wallich*; alt. 11,000 ft., *Strachey & Winterbottom.* GURWHAL, *Falconer, Edgeworth.* SIRMORE, *Vicary.*

Stems 4–12 in., many or few from the root, simple, hairy or finally nearly glabrous. *Leaves* 1 by $\frac{1}{4}$ in. in Wallich's type, crenate-dentate; often much smaller, narrower, subentire; in Falconer's examples larger, broad-elliptic, subpetiolate. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in., ovoid, lobed subacutely $\frac{1}{3}$ its length. *Corolla* 1 by $\frac{1}{2}$ in., tubular-funnel-shaped; lobes ovate, somewhat spreading, hairy at least in the throat within. *Capsule* $\frac{1}{2}$ in., ovoid-conic, superior for $\frac{5}{6}$ its length. *Seeds* $\frac{1}{16}$ in., narrowly oblong-ellipsoid.

3. **C. linifolius,** *Wall. Cat.* 3722; leaves sessile small oblong entire glabrous above closely scabrid-pilose beneath, flowers subsessile, calyx black-hirsute unaltered in fruit. *H. f. & T. in Journ. Linn. Soc.* ii. 20, *in part.* C. microphyllus, *Edgew. in Trans. Linn. Soc.* xx. 81.

KUMAON; *Blinkworth*; Mana, *Edgeworth*; Ralam River, alt. 11,000 ft., *Strachey & Winterbottom.* GURWHAL; *Falconer.*

Stems 3–10 in., very many from the root, simple, hairy or nearly glabrous. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., usually narrowly oblong, sometimes ovate, margins often recurved. *Calyx* $\frac{1}{3}$ in., cylindric, lobed acutely about $\frac{1}{2}$ its length. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., densely hairy in the throat within. *Capsule* and seeds nearly as in *C. integer.*—Hardly separable from *C. integer*; the stems are usually more hairy, the leaves smaller and narrower, glabrous on the upper surface, the calyx is rather shorter and more deeply divided, and the flowers somewhat smaller.

4. **C. pedunculatus,** *Clarke*; leaves sessile oblong entire scabrid-pilose on both surfaces, peduncles $\frac{1}{2}$–1½ in. patently black-hirsute as is the calyx. C. linifolius, *H. f. & T. in Journ. Linn. Soc.* ii. 20, *in part.*

ALPINE SIKKIM; Lachoong and Samdong, alt. 12–16,000 ft., *J. D. H., Elwes.* Yakla, alt. 14–16,000 ft., *Clarke.*

Stem 3–8 in., simple or with weak barren branches near the base, glabrescent below, hairy upwards. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{8}$–$\frac{1}{4}$ in. *Calyx* $\frac{1}{3}$ in., cylindric, lobed acutely to the middle, unaltered in fruit. *Corolla* 1 by $\frac{1}{2}$ in., tubular-funnel-shaped, glabrous in the throat or very nearly so. *Capsule* and *seeds* nearly as in *C. integer.*—This was included by H. f. & T. under *C. linifolius*, from which it differs in the pilose upper surface of the leaves, the peduncled flowers and the glabrous corolla-throat.

5. **C. incanus,** *H. f. & T. in Journ. Linn. Soc.* ii. 20; leaves oblong hispid-pilose on both surfaces, flowers subsessile, calyx fulvous hirsute in fruit subinflated reticulately veined finally glabrescent.

ALPINE SIKKIM; Lachen, Tungu and Yeumtong, alt. 12–16,000 ft., *J. D. H., Elwes.*

Stem 3–4 in., many from one root, wiry, simple, patently hispid. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., nearly entire, subsessile. *Calyx* $\frac{1}{4}$ in., broadly cylindric, acutely lobed half its length, when young more or less hairy or glabrous. *Corolla* $\frac{3}{4}$–1 in., oblong-funnel-shaped, throat densely hairy, lobes somewhat spreading. *Capsule* $\frac{1}{3}$ in., ovoid-conic, superior for $\frac{5}{6}$ its length, loose within the much enlarged inflated calyx. *Seeds*

scarcely $\frac{1}{30}$ in., ellipsoid.—This species by its inflated fruiting-calyx and minute seeds differs considerably from all the preceding species, and approaches the next section.

** *Root annual; stems branched, lateral branches often flowering.*

6. **C. inflatus,** *H. f. & T. in Journ. Linn. Soc.* ii. 21; stem procumbent loosely branched, leaves petioled round, flowers subsessile, calyx in fruit globose-conic.

ALPINE SIKKIM; alt. 11–16,000 ft., general. BHOTAN; *Griffith* (Kew Distrib. n. 3434).

Stems 6–30 in., with long branches, patently pilose or at length glabrate. *Leaves* $\frac{1}{4}$ in. diam., margin more or less sinuate, hairy on both surfaces or nearly glabrous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Calyx* $\frac{1}{3}$ in., ovate, lobed less than $\frac{1}{4}$ its length, hairy; in fruit much widened at the base, membranous, often conspicuously nerved, ultimately nearly glabrous. *Corolla* $\frac{1}{2}$ in., tubular, hardly widened at the mouth. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., oblong-conic; valves often far exceeding the narrow calyx-mouth. *Seeds* scarcely $\frac{1}{30}$ in., ellipsoid.

7. **C. Hookeri,** *Clarke*; stems ascending rigid with short lateral flowering branches, leaves petioled ovate, calyx in fruit ellipsoid closely embracing the capsule. Cyananthus sp. n. 6, *H. f. & T. in Journ. Linn. Soc.* ii. 21.

EAST NIPAL; Wallanchoon, alt. 13,000 ft., *J. D. H.*

Stems 3–8 in. (or more), many from one root, wiry, ultimately glabrescent; lateral branches $\frac{1}{4}$–1 in. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in., hirsute; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Calyx* in fruit $\frac{1}{5}$–$\frac{1}{4}$ by $\frac{1}{6}$ in., patently fulvous-hirsute, lobed acutely half its length. *Capsule* $\frac{1}{5}$ by $\frac{1}{6}$ in., ellipsoid, 3–5 (mostly 4–) valved, included in the calyx. *Seeds* $\frac{1}{30}$ in., ellipsoid.—The specimens are in ripe fruit only, but the species is evidently distinct from all the others; the calyx and capsule are very much smaller.

8. CAMPANUMÆA, *Blume.*

Perennial herbs; root tuberous; stem twining or rambling with long straight branches. *Leaves* opposite or alternate, short- or long-petioled, entire crenate or serrate. *Flowers* peduncled, solitary, lateral or terminal. *Calyx* inferior or superior; lobes 4–6, long, broad or narrow, persistent. *Corolla* epigynous, campanulate, white with a short tube, or lurid large with a long tube; lobes 4–6. *Stamens* 4–6, inserted round the base of the corolla-tube. *Ovary* 4–6-celled; style cylindric, stigma of 4–6 short lobes. *Fruit* indehiscent, truncate. *Seeds* very many, small, ellipsoid.—Species 5–6, Himalaya, Malaya, S. China, Japan.

SECT. I. **Eucampanumæa.** *Stem* twining; inflorescence lateral. *Calyx-lobes* broad, herbaceous. *Corolla* campanulate, large, lurid purple. *Seeds* ellipsoid, prominently reticulated.—Differs from *Codonopsis* only in the baccate truncate fruit.

1. **C. javanica,** *Blume Bijd.* 727; leaves ovate-cordate glabrous, calyx nearly free from the hemispheric berry. *DC. Prodr.* vii. 423; *Fl. des Serres,* t. 1264; *H. f. & T. in Journ. Linn. Soc.* ii. 9; *Kurz in Journ. As. Soc.* 1877, pt. ii. 209. C. javanica, *Hook. f. Ill. Him. Pl.* t. 16, B. C. cordata, *Bot. Mag.* t. 5372, *not of Hassk.* Codonopsis, sp. 2, *Griff. Notul.* iv. 280.

SIKKIM, BHOTAN and KHASIA MTS., alt. 3–7000 ft., frequent. BIRMA; Karen Hills, *Kurz*.—DISTRIB. Java.

Leaves opposite or nearly all alternate, 2 by 1 in., acute, deeply cordate, entire or crenate-serrate, glaucous beneath; petiole $\frac{1}{4}$–1 in. *Peduncles* solitary, axillary or leaf-opposed, as long as the petioles. *Calyx-tube* very short, adnate to the base of the

ovary; lobes $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$ in., ovate-lanceolate, approximate, glabrous. *Corolla* $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{2}$–1 in., lurid yellow with purple veins. *Ovary* 5–4- (rarely 3-) celled. *Berry* $\frac{1}{2}$–1 in. diam., hemispheric, broader than long, glaucous, black-purple, the persistent somewhat enlarged calyx-lobes spreading from near its base.—*Codonopsis cordata* (Hassk. in Retzia, i. 9) may be only a var. of this, as Kurz states; but Hasskarl's examples differ in the leaves being sparsely hairy above with much spreading hairs on the nerves beneath, a state unknown in India.

2. **C. inflata,** *Clarke*; leaves ovate-cordate nearly glabrous, calyx adnate nearly to the summit of the ellipsoid berry. Codonopsis inflata, *Hook. f. Ill. Him. Pl.* t. 16, C.; *H. f. & T. in Journ. Linn. Soc.* ii. 13.

SIKKIM and BHOTAN; alt. 5–8000 ft., common.

Leaves alternate sometimes opposite, 3 by $1\frac{3}{4}$ in., acute, deeply cordate, entire or crenate-dentate, glaucous beneath, glabrous or sparsely pilose above; petiole $\frac{1}{2}$-2 in. *Peduncles* mostly leaf-opposed, as long as the petioles. *Calyx-lobes* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$ in., ovate-lanceolate, approximate, glabrous or nearly so. *Corolla* $1\frac{1}{4}$ by $\frac{3}{4}$ in., lurid yellow with purple veins. *Ovary* 3-celled. *Berry* $\frac{3}{4}$–$\frac{1}{2}$ in., cylindric from a hemispheric base, usually at least as long as broad, glaucous, black-purple, crowned by a flat pentagonal disc.

SECT. II. **Cyclocodon** (Gen. *Griffith*). Perennial, erect herbs, with long spreading branches. *Leaves* opposite. *Inflorescence* terminal. *Calyx-lobes* narrow. *Corolla* small, with a very short tube, white. *Seeds* ovoid, testa not reticulated.

3. **C. celebica,** *Blume Bijd.* 727; leaves short-petioled lanceolate serrate, calyx-tube adnate to the 5-celled ovary. C. truncata, *Endl. Gen. Plant.* i. 515. Codonopsis truncata, *Wall. Cat.* 1301; *DC. Prodr.* vii. 423. C. celebica *and* leucocarpa, *Miq. Fl. Ind. Bat.* ii. 565, 566. C. albiflora, *Griff. Notul.* iv. 279. Cyclocodon lancifolium, *Kurz in Flora*, 1872, 303, *and in Journ. As. Soc.* 1877, ii. 210, *partly*. C. truncatum, *H. f. & T. in Journ. Linn. Soc.* ii. 18. C. adnatus, *Griff.*; *Benth. in Gen. Pl.* ii. 558. Campanula lancifolia, *Roxb. Fl. Ind.* i. 505; *A. DC. Prodr.* vii. 485.

SIKKIM HIMALAYA; alt. 4–6000 ft., frequent. CHITTAGONG and BIRMA; alt. 0–3000 ft., frequent.—DISTRIB. Malaya, Ava, S. China.

Erect, 3–4 ft. high with horizontal long and drooping branches. *Leaves* 3 by 1 in., base cuneate or rounded, teeth sometimes obscure, glabrous or with scattered hairs, often glaucous beneath; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Flowers* solitary, terminal, and in the forks of a dichotomous cyme; peduncle $\frac{1}{3}$ in. *Calyx* in bud very shortly adnate to the ovary, in fruit adnate shortly or half way up, sometimes nearly to the base of the corolla; teeth $\frac{1}{6}$–$\frac{1}{2}$ in., linear-lanceolate, usually serrate. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., epigynous, very shortly campanulate, white, fading somewhat into yellow, but not at all lurid glaucous as in sect. *Eucampanumea.* *Ovary* 5–6-celled. *Berry* $\frac{1}{3}$ in. diam., globose, white, little succulent, ultimately dry and breaking up irregularly.—The Amoy species admitted by Bentham (Gen. Pl. ii. 558) as having a 6-merous corolla, does not differ from the 6-merous Pegu plant.

4. **C. parviflora,** *Benth. in Gen. Pl.* ii. 558; leaves shortly petioled lanceolate caudate-serrate, calyx free from the 4-celled ovary. Codonopsis parviflora, *Wall. Cat.* 1300; *DC. Prodr.* vii. 423. Cyclocodon distans, *Griff. Notul.* iv. 277; *Ic. Pl. Asiat.* t. 481. C. parviflorum, *H. f. & T. in Journ. Linn. Soc.* ii. 18 (*exclud. syn.* Campanumæa celebica). C. lancifolium, *Kurz in Journ. As. Soc.* 1877, ii. 210, *partly*.

SIKKIM, BHOTAN and KHASIA MTS.; alt. 1–5000 ft., common.

Closely resembling *C. celebica*, and united with it by Kurz, but the calyx is entirely free, and $\frac{1}{8}$–$\frac{1}{6}$ in. below the fruit. This degree of adherence of the calyx is, however, so very variable in *C. celebica*, that Kurz does not distinguish this species by

it. The flowers in *C. parviflora* are not always smaller than in *C. celebica*, but they seem always 4-merous, while the flowers of *C. celebica* appear invariably 5–6-merous; a character of little weight in *Campanulaceæ*.

PERACARPA, *H. f. & T.*

A slender prostrate herb. *Leaves* alternate and opposite, petioled, ovate. *Pedicels* axillary, 1-flowered, clustered or solitary. *Flowers* small, purple or white. *Calyx* superior; teeth 5, oblong-linear, persistent. *Corolla* campanulate, 5-lobed. *Stamens* 5, free from the corolla. *Ovary* inferior, 2-celled. *Fruit* dry, indehiscent, white, membranous, 3- (or 2–1-) celled, 6–30-seeded. *Seeds* fusiform-ellipsoid, dark brown, smooth.

1. **P. carnosa,** *H. f. & T. in Journ. Linn. Soc.* ii. 26. Campanula carnosa, *Wall. Cat.* 1282, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 102; *DC. Prodr.* vii. 474.

KUMAON to BHOTAN; alt. 5–11,000 ft., in wet places frequent. KHASIA MTS.; alt. 5–6000 ft., *H. f. & T.*

A very weak, succulent herb, 3–8 in., branching. *Leaves* $\frac{1}{4}$-$\frac{2}{3}$ in., obtuse or acute, entire or crenate, glabrous or scabrid; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Pedicels* sometimes 1 in. solitary, sometimes clustered and less than $\frac{1}{20}$ in. *Calyx-teeth* $\frac{1}{10}$ in. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., sack-like, often unsymmetric by the suppression of one cell.

10. PENTAPHRAGMA, *Wall.*

Perennial herbs; stem short, sparingly branched. *Leaves* alternate, large, often very unequal at the base. *Spikes* dense, scorpioid, shortly peduncled; flowers in two ranks; bracts membranous, short. *Calyx* superior; lobes 5, long, obtuse, persistent. *Corolla* campanulate, 5-lobed, white. *Stamens* 5, epigynous, free; anthers ovate. *Ovary* inferior, 3–5-celled; style short, cylindric, stigma peltate obscurely 3–5-lobed. *Berry* inferior. *Seeds* very many, small, testa prominently reticulated.—Species 3, Malayan.

1. **P. begoniæfolium,** *Wall. Cat.* 1313; leaves ovate serrate, calyx-teeth $\frac{1}{6}$ in. subquadrate-oblong obtuse, fruit $\frac{1}{4}$–$\frac{1}{3}$ in. turbinate ellipsoid, *A. DC. Prodr.* vii. 496; *H. f. & T. in Journ. Linn. Soc.* ii. 26; *Kurz in Journ. As. Soc.* 1877, ii. 201. Phyteuma begonifolium, *Roxb. Hort. Beng.* 85; *Fl. Ind.* i. 505; *Jack in Hook. Bot. Misc.* i. 276, t. 57.

MERGUI, *Griffith.* PENANG and SINGAPORE, *Roxburgh*, &c.

Stem 6–12 in., succulent, scabrous-villous. *Leaves* 6–8 by 4–5 in. ovate with the base excised on one side, cordate and auricled on the other; or oblong base equal and cuneate; scabrous-pilose on the nerves beneath, otherwise nearly glabrous; petiole $\frac{1}{4}$–1 in. *Peduncle* $\frac{1}{4}$–1 in., lateral near the summit of the stem, carrying 1–3 ovate alternate sessile bracts $\frac{1}{2}$ in. diam. *Spike* 1–4 in.; bracts 2-ranked, obovate or elliptic, $\frac{1}{4}$ in. long; bracts ovary and calyx weakly villous. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. long and broad, lobes deep, broad, obtuse.—This genus is unlike other *Campanulaceæ* in habit; and *P. begoniæfolium* so simulates *Epithema* (*Cyrtandraceæ*) in leaves and inflorescence, that these plants are mixed under Wall. Cat. 1313.

11. SPHENOCLEA, *Gaertn.*

An annual, erect herb. *Leaves* alternate, lanceolate, entire. *Spikes* lateral and terminal, peduncled, cylindric, dense-fld., apex conical. *Flowers* small, sessile; bracteate and 2-bracteolate. *Calyx* $\frac{1}{2}$-inferior; limb 5-fid, segments ovate. *Corolla* campanulate, epigynous, 5-lobed. *Stamens* 5, on the corolla,

alternate with its segments, filaments short linear; anthers ovate. *Ovary* at first inferior, 2-celled; ovules very many on stalked placentas; style short, stigma obscurely 2-lobed. *Capsule* ½-inferior, membranous below; crown superior, depressed, conical, circumsciss, hard. *Seeds* very many, narrowly oblong; testa somewhat lax.

1. **S. zeylanica,** *Gaertn. Fruct.* i. 113, t. 24, fig. 5; *Roxb. Fl. Ind.* i. 507; *Wall. Cat.* 1516; *Kurz in Journ. As. Soc.* 1877, ii. 209. S. Pongatium, *A. DC. Prodr.* vii. 548; *Wight Ill.* t. 138; *Boiss. Fl. Orient.* iii. 963. Pongatium indicum, *Lamk. Ill.* ii. 444. Gaertnera Pangati, *Retz Obs.* vi. 24. Rapinia herbacea, *Lour. Fl. Cochinch.* (*ed. Willd.*) i. 157. Sphenoclea, *Griff. Notul.* iv. 276.—*Rheede Hort. Mal.* xi. t. 24.

Throughout INDIA; in swamps.—DISTRIB. In both hemispheres in warm regions.

Stem 12–24 in. *Leaves* 2–3 by ¼–1 in., narrowed at both ends, sometimes shortly petioled. *Peduncles* ½–1 in.; spikes ½–1½ in., dense both in flower and fruit. *Calyx-lobes* $\frac{1}{16}$ in.; in fruit somewhat enlarged, $\frac{1}{10}$ in., triangular, closely inflexed over the disc. *Corolla* $\frac{1}{12}$ in., lobes short, valvate in bud (Griffith says imbricate). *Fruit* ⅙ in. diam. *Seeds* minute, scabrous from microscopic papillæ or scales.

12. **PHYTEUMA,** *Linn.*

Perennial herbs. Radical *leaves* petioled, cauline alternate. *Flowers* capitate, spicate, or (in all the Indian species) panicled. *Calyx-tube* adnate, obconic; limb 5-partite. *Corolla* rotate, 5-lobed nearly to the base, segments 5 narrow. *Stamens* free from the corolla, filaments widely dilated at the base; anthers free. *Ovary* 2-celled (in the Indian species); ovules very many in each cell. *Style* cylindric; stigma 2-fid. *Capsule* dehiscing by small valves on the sides. *Seeds* minute, ellipsoid.—Species 50, Europe, N. Africa and Temp. Asia.

The Indian species belongs to the sub-genus *Podanthus*, G. Don, referred by Boissier on account of the lax inflorescence to *Campanula*: retained by Bentham in *Phyteuma* on account of the shape of the corolla.

P. Thomsoni, *Clarke*; nearly glabrous, erect, cauline leaves petioled ovate-lanceolate, flowers numerous laxly panicled, corolla segments linear-oblong, ovary 2-celled, stigma 2-lobed. Campanula Thomsoni, *H. f. & T. in Journ. Linn. Soc.* ii. 25. Symphyandra stylosa, *Royle Ill.* 253.

NORTH-WEST HIMALAYA; alt. 6–8000 ft., *Thomson.* KASHMIR, *Jacquemont, Henderson, Aitchieson.*

Root long, woody. *Stems* ½–4 ft. *Cauline leaves* 3 by 1½ in., obscurely crenate; lower leaves suborbicular, petioled. *Panicle* with many branches 6–12 in., naked, weak, flowering at the tops; sometimes reduced to a simple terminal cluster. *Pedicels* ⅛–¼ in. *Calyx-teeth* ¼ in., subulate. *Corolla-lobes* ¼–⅓ by $\frac{1}{10}$–⅛ in., blue. *Filaments* very short, pubescent, connivent; anthers large, oblong, at first forming a cylinder round the style, but quite free. *Fruit* unknown.—The deeply partite corolla and 2-celled ovary refer this plant to *Phyteuma*, though the lax inflorescence is campanula-like.

13. **CAMPANULA,** *Linn.*

Perennial or annual herbs, erect or decumbent. *Leaves* alternate, or the radical subrosulate, from ovate to linear. *Flowers* peduncled or subsessile, axillary or terminal, panicled spicate or subcapitate, purple or white. *Calyx-tube* adnate to the ovary, turbinate; limb deeply 5-lobed, persistent. *Corolla* campanulate, 5-fid (in *C. fulgens* 5-partite). *Stamens* 5, free, filaments dilated at the base; anthers free. *Ovary* inferior, 3- (rarely 4–5-) celled; ovules very

many in each cell; style cylindric, stigma shortly 3–5-lobed. *Capsule* obovoid or elongate, truncate, dehiscing by small valves at the base or on the sides outside the calyx-lobes. *Seeds* very many, minute, ellipsoid or small compressed margined.—Species 230, natives chiefly of the north temperate hemisphere.

SECT. I. *Capsule* dehiscing by valves at the base.

* *Tall erect herbs; cauline leaves broadly lanceolate or ovate; seeds (large for* Campanula) *much compressed, margined.*

1. **C. latifolia,** *Linn.*; *DC. Prodr.* vii. 469; cauline leaves ovate or broadly lanceolate somewhat pubescent, flowers suberect large, calyx-teeth lanceolate subentire. *Bot. Mag.* t. 2553; *H. f. & T. in Journ. Linn. Soc.* ii. 22; *Boiss. Fl. Orient.* iii. 921. C. Brunonis, *Wall. Cat.* 1285. C. macrantha, *Bot. Mag.* t. 3347. C. eriocarpa, *Bieb. Fl. Taur. Cauc.* i. 149.

WESTERN HIMALAYA; alt. 8–11,000 ft., from Kashmir to Kumaon, frequent.—DISTRIB. N. & W. Asia, Europe.

Erect, 2–6 ft., corymbose upwards, branches ascending. *Upper leaves* 3 by 1–2 in., subsessile, cuneate or rounded at the base, crenate-serrate, herbaceous. *Pedicels* $\frac{1}{4}$–$\frac{1}{2}$ in., recurved in fruit. *Calyx-teeth* $\frac{1}{2}$ in., minutely pilose. *Corolla* $1\frac{1}{4}$ by 1 in., purple. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in, glabrous or very nearly so. *Seeds* $\frac{1}{12}$ in.

2. **C. khasiana,** *H. f. & T. in Journ. Linn. Soc.* ii. 25; cauline leaves ovate or broadly lanceolate hispid, flowers nodding, calyx-teeth narrowly lanceolate sharply serrate.

KHASIA MTS.; alt. 4–6000 ft., plentiful.

Erect, 1–4 ft., sparingly corymbose upwards, branches ascending. *Upper leaves* $1\frac{1}{2}$–2 by $\frac{1}{2}$–$\frac{3}{4}$ in., sessile, base obtuse, crenate-serrate, rigid, nerves beneath elevated. *Pedicels* $\frac{1}{8}$–$\frac{1}{4}$ in., lower apparently often elongated, 2–3 in., with small bracts near the summit whence may rise flowers. *Calyx-teeth* $\frac{1}{3}$ in., glabrous or nearly so, serratures few very sharp. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in., and nearly as wide at the mouth, funnel-shaped rather than campanulate, purple. *Stigma* 3-lobed. *Capsule* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid, narrowed upwards, glabrous. *Seeds* $\frac{1}{16}$–$\frac{1}{12}$ in.

** *Erect herbs, with slender straight stems; seeds minute, ellipsoid, little compressed.*

3. **C. sylvatica,** *Wall. Cat.* 1293, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 97; leaves linear pilose, calyx-teeth linear-lanceolate $\frac{1}{4}$–$\frac{1}{3}$ in. *A. DC. Prodr.* vii. 471; *H. f. & T. in Journ. Linn. Soc.* ii. 22. C. stricta, *Wall. in As. Research.* xiii. 374, *not of Linn.* C. integerrima, *Don Prodr.* 155. C. caperonioides, *Klotzsch in Reis. Pr. Waldem. Bot.* 73, t. 78, fig. 1.

TEMPERATE HIMALAYA; Gurwhal to Nipal, alt. 5–9000 ft., *Wallich, Thomson, Edgeworth, Strach. & Winterb.*; Bhotan, *Griffith.*

Stems 8–12 in., pilose, *Leaves* 2 by $\frac{1}{10}$ in., in Griffith's Bhotan example 2 by $\frac{1}{5}$ in. *Panicle* lax, few-flowered; pedicels $\frac{1}{8}$–$\frac{3}{4}$ in., puberulous. *Corolla* $\frac{1}{2}$–$\frac{1}{3}$ by $\frac{1}{3}$ in., shortly 5-lobed. *Capsule* $\frac{1}{4}$ in. long and broad, obconic, finally glabrous, crowned by the somewhat elongated calyx-teeth.

4. **C. canescens,** *Wall. Cat.* 1289; hairy, leaves oblong or lanceolate crenate, calyx-teeth linear-lanceolate $\frac{1}{10}$–$\frac{1}{5}$ in. *A. DC. Prodr.* vii. 473; *H. f. & T. in Journ. Linn. Soc.* ii. 23; *Kurz in Journ. As. Soc.* 1877, pt. ii. 209; *Boiss. Fl. Orient.* iii. 934. C. Benthamii, *Wall. Cat.* 1290. Cephalostigma spathulatum, *Thwaites Enum.* 422.

Throughout NORTHERN INDIA; alt. 0–5000 ft., from the Himalaya to Central India and Pegu, very common. CEYLON, *Thwaites.*

Stems 6–24 in. *Leaves* 1 by $\frac{1}{4}$–$\frac{1}{2}$ in. *Flowers* numerous, clustered in panicles,

dimorphic (both forms frequently on one stem); one form complete, the other very much smaller without corolla or stamens. *Calyx-teeth* $\frac{1}{5}$ in. in the perfect flower, often scarcely $\frac{1}{12}$ in. in the imperfect. *Corolla* $\frac{1}{4}$ by $\frac{1}{5}$ in., broadly campanulate, shortly lobed, grey-purple. *Ovary* 3-celled, or in large hill examples 5-celled. *Capsule* $\frac{1}{5}$–$\frac{1}{4}$ in. in diam.; or in the imperfect flowers often scarcely $\frac{1}{10}$ in., producing perfect seeds. *Seeds* very minute.

*** *Herbs, much branched or with flexuose stems; seeds minute, ellipsoid, little compressed.* (The species are closely allied and hardly separable.)

5. **C. colorata,** *Wall. Cat.* 1287, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 101; stem terete patently hairy, leaves subremote lanceolate repand-dentate softly pilose on both surfaces, calyx-teeth lanceolate, corolla $\frac{1}{3}$ by $\frac{1}{6}$ in. laxly pilose without. *A. DC. Prodr.* vii. 473; *H. f. & T. in Journ. Linn. Soc.* ii. 23. C. Moorcroftiana, *Wall. Cat.* 1288. C. ramulosa, *Wall. Cat.* 1286, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 100; *A. DC. l. c.*; *Wight Ic.* t. 1178; *Boiss. Fl. Orient.* iii. 934. C. nervosa, *Royle Ill.* 253. C. pallida, *Wall. in As. Research.* xiii. 375, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 100; *Don Prodr.* 156; *A. DC. l. c.* C. Hoffmeisteri *and* himalayensis, *Klotzsch in Reis. Pr. Waldem. Bot.* 73, 74, t. 77, and t. 78, fig. 2.

TEMPERATE HIMALAYA, alt. 3–10,000 ft.; from Kashmir to Khasia, very common. WESTERN GHATS, alt. 5–7000 ft.—DISTRIB. Cabul.

Stem 6–24 in., suberect, flexuose or very much branched. *Leaves* 1 by $\frac{1}{4}$–$\frac{1}{2}$ in., often spathulate or subpetioled. *Pedicels* sometimes 1–2 in., slender, sometimes short rigid. *Calyx-teeth* $\frac{1}{6}$–$\frac{1}{4}$ in., lanceolate or triangular-lanceolate, entire or toothed. *Corolla* purple or grey-purple, lobed from $\frac{1}{3}$–$\frac{1}{2}$ its length; as in *C. canescens*, flowers without corolla or stamens occur, in which the calyx and the fruit are much smaller. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ in. long and broad, obconic, cernuous, obviously inferior. *Seeds* ellipsoid, very small.

VAR. *tibetica*, H. f. & T. in Journ. Linn. Soc. ii. 23; calyx-teeth wide overlapping at the base, lower portion of the capsule shortened so that it appears only half-inferior.—North Kashmir and West Tibet, alt. 8–12,000 ft., frequent.—This is considered a var. by H. f. & T., but it seems as remarkable a form of *C. colorata* as some others admitted by them as species. The var. *anomala*, H. f. & T. l. c., is the extreme form of var. *tibetica*, having the calyx-lobes (in fruit) nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., almost cordate at the base, the calyx-tube only shortly adnate.

6. **C. Alphonsii,** *Wall. Cat.* 1296; stems wiry angular densely leafy, leaves small oblong repand-dentate pilose on both surfaces and somewhat tomentose beneath, calyx-teeth broadly lanceolate entire or slightly toothed, corolla $\frac{1}{4}$ by $\frac{1}{6}$ in. laxly pilose without. *A. DC. Prodr.* vii. 473; *Wight Spic. Neilgh.* ii. 22, t. 125; *Ic.* t. 1177; *H. f. & T. in Journ. Linn. Soc.* ii. 24.

NILGHERRY MTS., alt. 6–8000 ft., frequent.

Leaves (in the typical form) $\frac{1}{3}$ by $\frac{1}{6}$ in., very closely placed on the stem; but in Dalzell's example (? from the Concan) the leaves are larger, more scattered, and the plant approaches *C colorata*. H. f. & T. suggest that *T. Alphonsii* may be a var. of *C. cana.*

7. **C. cana,** *Wall. Cat.* 1284; stems patently hispid, leaves oblong toothed scabrous-pilose above somewhat tomentose beneath, calyx-tube hirsute, teeth broadly lanceolate coarsely toothed, corolla $\frac{1}{3}$ by $\frac{1}{6}$ in. hairy without. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 101; *A. DC. Prodr.* vii. 472; *H. f. & T. in Journ. Linn. Soc.* ii. 22, *var. β only.*

WESTERN HIMALAYA; from Kumaon, alt. 7500 ft., to Nipal, *Wallich.* MISHMI HILLS, *Griffith* (Kew Distrib. n. 3431, 3432).

Leaves $\frac{1}{3}$ by $\frac{1}{6}$ in. in Wallich's plant; twice as large in Edgeworth's, in which also

the corolla is $\frac{1}{2}$ by $\frac{1}{4}$ in.—Wallich's *cana* is here described; his description (and A. DC.'s taken therefrom) probably includes *C. alsinoides* (and *C. argyrotricha*?). These species ought perhaps to be included under *cana*. But the fine large blue *Campanula* described as *C. cana* by H. f. & T. is a Kashmir and West Tibet plant, which it is not likely that Wallich ever saw.

8. **C. alsinoides,** *H. f. & T. in Journ. Linn. Soc.* ii. 24; stems slender patently hairy, leaves oblong-ovate subpetioled obscurely toothed pilose on both surfaces, capsule small subglobose, calyx-teeth small narrowly lanceolate.

NORTH-WEST HIMALAYA, alt. 8–10,000 ft.; Piti, Kunawur, Tarkiti, and Kishtwar, *Thomson*; Gurwhal, *Falconer*.

Several times collected, but always in fruit. *Stems* 4–8 in., exceedingly numerous from a woody root. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., thin, herbaceous. *Peduncles* $\frac{1}{4}$–1 in., slender. *Flowers* unknown. *Calyx-teeth* (on the fruit) $\frac{1}{16}$–$\frac{1}{8}$ in., entire or somewhat toothed. *Capsule* $\frac{1}{8}$ in. diam., rounded at the base.—H. f. & T. suggest that this may be an apetalous form of *C. colorata* (or of a closely allied plant), but the shape of the capsule, and the small weak calyx-teeth differ from all these; it may be more nearly allied to *C. argyrotricha*.

9. **C. argyrotricha,** *Wall. Cat.* 7138; softly pilose and with spreading white needle-like hairs on the stems and leaves, leaves ovate entire or toothed, calyx-teeth elliptic-oblong, corolla $\frac{1}{2}$ by $\frac{1}{3}$ in. sparingly pilose without. *A. DC. Prodr.* vii. 473; *H. f. & T. in Journ. Linn. Soc.* ii. 24.

NORTH-WEST HIMALAYA, alt. 8–11,500 ft.; from East Kashmir to Kumaon, *Wallich, Jacquemont, Falconer*, &c.

Stems numerous, 4–8 in., weak, curved, procumbent. *Leaves* $\frac{1}{2}$ by $\frac{1}{3}$ in., often subpetioled, thin, herbaceous. *Pedicels* $\frac{1}{4}$–$1\frac{1}{2}$ in. *Calyx-teeth* $\frac{1}{6}$–$\frac{1}{4}$ in., entire, rarely with few teeth. *Capsule* $\frac{1}{5}$ in. diam., base rounded.

10. **C. cashmiriana,** *Royle Ill.* i. 254, t. 62, fig. 1; stem terete villous, leaves oblong closely villous or hoary tomentose on both surfaces, calyx-teeth ovate-lanceolate subentire, corolla $\frac{3}{4}$–1 by $\frac{1}{2}$–$\frac{2}{3}$ in. broadly campanulate bright-blue. *A. DC. Prodr.* vii. 473; *H. f. & T. in Journ. Linn. Soc.* ii. 24. C. cana, *H. f. & T. in Journ. Linn. Soc.* ii. 22, *var. a only*.

WEST TIBET and KASHMIR, alt. 6–11,000 ft., common.

In the large form, *stems* rigid, zigzag, hoary villous or tomentose. *Leaves* 1 by $\frac{1}{3}$–$\frac{1}{2}$ in., thick, entire or sparingly crenate, woolly and often nerved beneath. *Calyx-teeth* $\frac{1}{4}$–$\frac{1}{3}$ in., hoary or closely villous, wide, sometimes overlapping at base. *Capsule* $\frac{1}{5}$ in., broader than long, half- (or more than half-) superior.—The fully developed form of this species, with zigzag stems and very large brilliant flowers, is *C. cana*, H. f. & T., var. *α*; the middle form, with flexuose stems and medium flowers, is *C. cashmiriana*, Royle type; the weak form, with smaller flowers, $\frac{1}{2}$ by $\frac{1}{5}$ in., less hairy without, is *C. evolvulacea*, Royle.

VAR. *evolvulacea*; leaves smaller, calyx-teeth lanceolate not greatly widened at the base, capsule inferior or less than half inferior. C. evolvulacea, *Royle Ill.* 253; *A. DC. Prodr.* vii. 473.—Western Himalaya, from Kashmir to Kumaon, alt. 6–10,000 ft., common.—Griffith's n. 2208 from Mishmi, referred by H. f. & T. to *C. cashmiriana*, has patently hispid stems and hispid calyx-teeth, and is hence referred by me to *C. cana*.

SECT. II. *Capsule* dehiscing by valves on the sides or towards the top.

11. **C. aristata,** *Wall. Cat.* 1291, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 98; glabrous, cauline leaves linear, calyx-teeth $\frac{1}{3}$ in. linear, capsule $\frac{3}{4}$ by $\frac{1}{8}$ in. dehiscing close to the summit. *A. DC. Prodr.* vii. 483; *H. f. & T. in Journ. Linn. Soc.* ii. 24.

ALPINE HIMALAYA, alt. 11–16,000 ft.; from Kashmir to Sikkim, frequent.

Stems 8–24 in., erect, simple. *Radical leaves* elliptic, long-petioled, subentire; cauline leaves $1\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{5}$ in. *Flowers* solitary; peduncle $\frac{1}{2}$–10 in. *Corolla* $\frac{1}{3}$ in. long and broad, conic, lobed half-way down, deep blue. *Capsule* narrowly oblong or sublinear, contracted near the summit. *Seeds* very small, ellipsoid.

12. **C. modesta,** *H. f. & T. in Journ. Linn. Soc.* ii. 24; glabrous, cauline leaves linear-oblong, calyx-teeth $\frac{1}{6}$ in. linear, capsule $\frac{2}{3}$ by $\frac{1}{3}$ in. dehiscing near the summit.

ALPINE SIKKIM, alt. 12–14,000 ft., *J. D. H.*

Stems 2–7 in., erect, simple. *Radical leaves* long-petioled, ovate, subentire; cauline $\frac{1}{2}$ by $\frac{1}{8}$ in., sessile, sparingly toothed. *Flowers* solitary; peduncle $\frac{1}{4}$–$1\frac{1}{2}$ in. *Corolla* $\frac{1}{3}$ in. long and broad, conic, lobed half-way down, deep blue. *Capsule* obovoid, long attenuate at the base, contracted near the summit. *Seeds* very small, ellipsoid. This is evidently an ally of *C. aristata*, but distinct specifically by the widely turbinate-clavate capsule.

13. **C. fulgens,** *Wall. Cat.* 1283, *and in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 99; leaves lanceolate pilose or glabrous, flowers subsessile in an interrupted spike or subcapitate, calyx-teeth linear. *A. DC. Prodr.* vii. 477; *Wight Ic.* t. 1179; *Ill.* t. 136; *H. f. & T. in Journ. Linn. Soc.* ii. 24.

NIPAL, SIKKIM, and KHASIA MTS., alt. 3–7000 ft., frequent. MALABAR and CEYLON, alt. 4–8000 ft., frequent.

Stems 8–30 in., suberect, sparingly branched. *Radical leaves* petioled, 2 by $\frac{3}{4}$ in., narrowed at both ends, crenate; cauline similar but sessile, or wider at the base, or (in the Malabar examples) 0. *Calyx-teeth* $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla* deeply divided with lanceolate segments in the Deccan examples, almost to the base with very narrow segments in the North Indian. *Ovary* 3-celled. *Capsule* from ellipsoid $\frac{1}{4}$ in. to narrow turbinate $\frac{1}{2}$ in.—This *Campanula*, having spicate inflorescence with a deeply-lobed corolla, might be removed to *Phyteuma*, and some of the Indian examples are indeed difficult to distinguish specifically from *Phyteuma campanuloides*, Bieb. (Bot. Mag. t. 1015).

ORDER LXXXI. **VACCINIACEÆ.** (By C. B. Clarke.)

Shrubs or small trees; sometimes epiphytes with the stems greatly thickened at the base. *Leaves* alternate or falsely whorled, entire or serrate; stipules 0. *Flowers* racemose or axillary and solitary; pedicels 1-bracteate and often 2-bracteolate, often thickened and articulate beneath the ovary. *Calyx-tube* ovoid, adnate to the ovary; limb 5-fid, usually persistent. *Corolla* tubular and 5-toothed, or shortly campanulate with 5 long segments, deciduous. *Stamens* 10, epigynous, free; anthers opening by apical pores, often produced upwards into 2 tubes opening by slits from the apex. *Ovary* inferior, 5-celled, or falsely 10-celled; style cylindric, stigma simple; ovules many (rarely few) at the inner angle of each cell. *Fruit* a berry, rarely dry, 5- or falsely 10-celled. *Seeds* many or several (rarely 1) in each cell, small, compressed, albuminous; radicle next the hilum.—Species 320, natives chiefly of cold and temperate regions.

TRIBE I. **Thibaudieæ.** *Corolla* long and tubular, or shortly campanulate with very long segments.

Calyx-tube terete. Seed with a loose outer coat . . . . . . 1. AGAPETES.
Calyx-tube 5-winged or 5-ribbed . . . . 2. PENTAPTERYGIUM.

TRIBE II. **Euvaccinieæ.** *Corolla* small, campanulate or ovoid, with short teeth.

Racemes axillary. *Testa* of the seed close . . . . 3. VACCINIUM.
Pedicels corymbose on axillary short peduncles . . . . 4. CORALLOBOTRYS.

1. **AGAPETES,** *D. Don.*

Shrubs, often epiphytic; stems often greatly thickened at the base. *Leaves* alternate, sometimes falsely whorled, from linear to elliptic, entire or toothed, sessile or shortly petioled, often with glands at the apex of the petiole, usually coriaceous. *Flowers* axillary, corymbose fascicled or solitary; pedicel often thickened or articulate under the ovary; bracts small. *Calyx-tube* globose; limb 5-fid or 5-partite, persistent. *Corolla* tubular or campanulate, shortly or deeply 5-lobed, red, often with transverse marks, or the lobes greenish-white. *Stamens* 10, filaments usually short; anthers elliptic, produced upwards in 2 long beaks opening by apical pores or slits, often spurred behind. *Ovary* 5-celled, or spuriously 10-celled; style cylindric, stigma capitate; ovules very many. *Berry* globose, succulent or nearly dry, 5-celled or spuriously 10-celled, often opening by 10 pores round the disk within the calyx-teeth. *Seeds* very many, ellipsoid, outer coat very lax.—Species 30, from Nipal and Bhotan to Borneo; 1 in Fiji.

SECT. I. *Corolla* elongate, lobed less than half its length, curved at the apex. *Anthers* not spurred on the back. *Corymbs* peduncled.

1. **A. setigera,** *D. Don*; *G. Don Gen. Syst.* iii. 862; leaves oblong or obovate-lanceolate narrowed suddenly into the very short petiole, pedicels and calyx more or less hirsute, filaments $\frac{1}{8}$ in. *DC. Prodr.* vii. 554. A. variegata, *DC. Prodr.* vii. 554, *as to descr. only, not of D. Don.* A. hirsuta, *Klotzsch in Linnæa*, xxiv. 38. Thibaudia setigera, *Wall. Cat.* 752. Vaccinium hirsutum, *Wight Ic.* t. 1182. V. verticillatum, *Wight Ic.* t. 1181; *Kurz in Journ. As. Soc.* 1873, ii. 83, and 1877, ii. 213 (*exclud. var. β and γ*); *For. Fl.* ii. 87, *var.* 1.

KHASIA MTS., alt. 5000 ft., common; extending thence to TAVOY.

Branches round, glabrous or patently hirsute. *Leaves* $4\frac{1}{2}$ by $1\frac{3}{4}$ in., often falsely whorled, coriaceous, entire or slightly toothed, glabrous, outer nerve nearly marginal or obscure. *Peduncles* $\frac{3}{4}$ in., arising mostly from the nodes with the whorls of leaves; pedicels $\frac{1}{2}$–1 in., widely dilated at the apex in fruit; bracts scarcely $\frac{1}{12}$ in.; calyx-teeth $\frac{1}{6}$ in. long, lanceolate. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., hirsute or pubescent, without rarely glabrous, deep red, the transverse V-shaped bars on the tube obscure. *Filaments* pilose or glabrous; anther-cells granular-scabrid. *Fruit* $\frac{1}{3}$ in., subglobose, ultimately nearly dry, usually hirsute even when ripe, seeds escaping by 10 pores round the disc; calyx-teeth in fruit enlarged, half as long as the fruit or longer.

VAR. *verticillata*; leaves narrowed sometimes attenuated into the petiole. A. verticillata, *D. Don*; *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 544. A. Wallichiana, *Klotzsch in Linnæa*, xxiv. 38. Thibaudia verticillata, *Wall. Cat.* 753. T. obliqua, *Griff. Ic. Pl. Asiat.* t. 515. Vaccinium Wallichianum, *Wight Ic.* t. 1180.—Khasia Mts., alt. 4000 ft.

VAR. *Roylei*; leaves suddenly narrowed into the petiole, pedicels and calyx glabrous. Vaccinium Roylei, *Kurz in Journ. As. Soc.* 1877, ii. 214. V. variegatum, *β* parviflorum, *Kurz in Journ. As. Soc.* 1873, ii. 84. Thibaudia variegata, *Royle Ill.* 257, t. 79, fig. 1, *exclud. all syn.* Agapetes variegata, *Hook. f. in Gen. Pl.* ii. 571, *not of Don.*—Khasia Mts., alt. 4000 ft., extending to lower Birma.—The type example of Wallich's *Thibaudia variegata*, n. 751, is the true *Ceratostemma variegatum* of Roxb.; but some of Wallich's duplicates issued as n. 751 are *Agapetes setigera*, whence has arisen some confusion in the names adopted by Sir J. D. Hooker and by Kurz.

2. **A. macrostemon,** *Clarke*; leaves oblong subsessile rounded at the base, pedicels and calyx glabrous, filaments $\frac{1}{3}$–$\frac{1}{2}$ in. Vaccinium macrostemon, *Kurz in Journ. As. Soc.* 1873, ii. 85; 1877, ii. 213; *For. Fl.* ii. 87.

BRITISH BIRMA; Martaban, alt. 4–6,000 ft., *Kurz.*

An epiphytic shrub, 2–4 ft. *Branches* thick, angular upwards. *Leaves* 6 by 2 in.,

entire, coriaceous, glabrous, often falsely whorled, marginal nerve obscure. *Corymbs* 3 in., with 12–15 flowers; peduncle $\frac{3}{4}$ in., pedicels $\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., narrowly lanceolate. *Calyx-limb* 5-fid about half its length; teeth $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate, subobtuse. *Corolla* $1\frac{1}{4}$ by $\frac{1}{4}$ in., distinctly curved at the apex, deep red, the transverse V-shaped bars on the tube obscure. *Filaments* glabrous; anther-cells granular-scabrous, somewhat connate into a tube. *Berry* fusiform-ovoid, narrowed at the apex and crowned with the cup-shaped limb of the calyx (*Kurz*).

SECT. II. *Corolla* tubular, elongate, lobed less than half its length, straight at the apex. *Flowers* in corymbs.

* *Corymbs distinctly peduncled; anthers granular, not spurred.* (See also *A. loranthiflora*, n. 12.)

3. **A. auriculata,** *Hook. f. in Gen. Pl.* ii. 571; leaves large sessile oblong-lanceolate from a rounded base, corymbs glabrescent, calyx-teeth $\frac{1}{5}$ in. narrowly lanceolate, corolla $\frac{3}{4}$ in. Vaccinium auriculatum, *Kurz in Journ. As. Soc.* 1877, ii. 214; *For. Fl.* ii. 89. Thibaudia auriculata, *Griff. Ic. Pl. Asiat.* t. 508.

EASTERN HIMALAYA; Sikkim, *J. D. H.*; and Bhotan, *Griffith.* KHASIA MTS., alt. 3–5000 ft., *Griffith.* MARTABAN, alt. 4000 ft., *Brandis* (*fide Kurz*).

Branches stout, glabrous, often angular upwards. *Leaves* 7 by $2\frac{1}{4}$ in., glabrous, nearly entire, coriaceous, often falsely whorled, marginal nerve distinctly continuous. *Peduncles* $\frac{1}{4}$–$1\frac{1}{2}$ in., stout, mostly proceeding from the whorls of leaves; pedicels 1 in., stout, much dilated and cup-shaped at apex; bracts $\frac{1}{12}$ in. *Corolla-tube* narrowing upwards, pubescent without at least when young, bright red, transverse V-shaped bars obscure; teeth $\frac{1}{8}$–$\frac{1}{6}$ in. *Fruit* $\frac{1}{4}$ in., ovoid, nearly dry, bright red; calyx-teeth $\frac{1}{4}$ in., broad-lanceolate, striate, connivent, forming a cone as long as the fruit.

4. **A. glabra,** *Clarke*; leaves sessile oblong-lanceolate from a rounded base, corymbs pubescent or cinereous almost tomentose, calyx-teeth $\frac{1}{8}$ in. triangular-lanceolate, corolla $\frac{3}{4}$ in. Thibaudia glabra, *Griff. Ic. Pl. Asiat.* t. 514.

BHOTAN and KHASIA, alt. 3–5000 ft., *Griffith, J. D. H.*, &c., not infrequent.

Branches round, glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., sometimes elliptic or ovate, glabrous, obscurely crenate, often whorled, marginal nerve obscure. *Peduncles* $\frac{1}{4}$–$1\frac{1}{2}$ in., mostly proceeding from the leaf-whorls, often many-flowered; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., slightly dilated upwards; bracts $\frac{1}{12}$ in. *Corolla-tube* narrowed upwards, pubescent, green upwards, below white with rose-coloured V-shaped transverse bars or nearly colourless; teeth $\frac{1}{8}$–$\frac{1}{6}$ in. *Fruit* nearly $\frac{1}{4}$ in., globose, ultimately nearly dry, seeds escaping by 10 pores round the disk; calyx-teeth very much shorter than the fruit, distant.—In Griffith's figure several of the leaves are shown hairy, but the leaves in Griffith's own n. 1218 are quite glabrous, as they are in all the other numerous examples.

5. **A. saligna,** *Hook. f. in Gen. Pl.* ii. 571; leaves shortly petioled lanceolate acuminate from a cuneate base, corymbs glabrous, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. lanceolate acute, corolla 1 in. Vaccinium salignum, *Hook. f. Ill. Him. Pl.* t. 15, fig. A.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 7000 ft., frequent, *Griffith* (Kew Distrib. n. 3467), *J. D. H.*, &c. MOULMEIN; Thoung-gyun, alt. 5000 ft., *Lobb.*

Branches not thick, scarcely angular. *Leaves* 3 by $\frac{3}{4}$–1 in., scattered, entire, glabrous, coriaceous, marginal nerve obscure. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in.; pedicels 1 in., gradually thickened upwards especially in fruit, cup at the apex hardly wider than the pedicel; bracts $\frac{1}{12}$ in. *Corolla-tube* somewhat widened upwards, glabrous, bright-red with obscure transverse V-shaped bars; lobes $\frac{1}{4}$–$\frac{1}{3}$ in. *Fruit* $\frac{1}{4}$ in., subglobose, scarlet (as are the fruiting pedicels), subbaccate; calyx-teeth scarcely altered, much shorter than the fruit.—Stems sometimes greatly thickened at the very base.

VAR. *cordifolia*; leaves rounded at the base nearly sessile.—Duphla Hills, *Lister*.

6. **A. salicifolia,** *Clarke*; leaves sessile narrowly lanceolate attenuate at both ends, corymbs glabrous, calyx-teeth $\frac{1}{8}$ in. oblong acute, corolla $\frac{5}{8}$ in.

MISHMI MTS.; Koond Rocks, *Griffith* (Kew Distrib. n. 3477).

Branches scarcely angular, glabrous. *Leaves* 4 by $\frac{1}{2}$–$\frac{3}{4}$ in., entire, coriaceous, often clustered, imperfectly whorled. *Peduncle* $\frac{1}{4}$ in.; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in.; bracts $\frac{1}{16}$ in. *Calyces*, with the peduncles, vermilion (Griffith). *Corolla* scarcely widened in the middle, vermilion with green lobes (Griffith); lobes scarcely $\frac{1}{10}$ in., triangular. *Fruit* not seen.

7. **A. miniata,** *Hook. f. in Gen. Pl.* ii. 571; leaves subsessile elliptic-lanceolate serrate, corymbs glabrous, calyx-teeth $\frac{1}{5}$ in. narrow-lanceolate, corolla $1\frac{1}{4}$ in. Ceratostemma miniatum, *Griff. Notul.* iv. 302; *Ic. Pl. Asiat.* t. 504. Vaccinium miniatum, *Kurz in Journ. As. Soc.* 1873, ii. 85; 1877, ii. 214; *For. Fl.* ii. 88.

Patkoy Mts., south-east of ASSAM, *Griffith* (Kew Distrib. n. 3475). KHASIA MTS., alt. 4000 ft.; Monai, *Clarke*.

Branches round, stout, smooth. *Leaves* 6 by $2\frac{1}{2}$ in., acute, falsely whorled, remotely shallowly serrate, base cuneate or rounded; petiole 0–$\frac{1}{6}$ in. *Peduncle* $\frac{1}{8}$–$\frac{1}{5}$ in., densely covered with bracts; pedicels $\frac{1}{4}$–1 in.; bracts $\frac{1}{6}$ in., lanceolate. *Corolla* slightly wider in the middle, vermilion (Griffith), no transverse bars visible in the dried plants nor suggested in Griffith's picture; lobes $\frac{1}{6}$ in., triangular. *Fruit* not seen.

8. **A. macrophylla,** *Clarke*; leaves petioled broadly lanceolate, corymbs glabrous, calyx-teeth $\frac{1}{3}$ in. narrowly lanceolate, corolla $1\frac{1}{4}$ in.

KHASIA MTS., *Griffith* (Kew Distrib. n. 3476).

Branches thick, rounded, smooth. *Leaves* 11 by $3\frac{1}{2}$ in., acuminate, cuneate or rounded at the base, remotely obscurely crenate-toothed, coriaceous; petiole $\frac{1}{2}$ in., exceedingly thick. *Peduncle* $\frac{1}{2}$–2 in.; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ in.; bracts $\frac{1}{4}$ in., lanceolate-linear. *Corolla* tubular, 5-angled, red, with transverse V-shaped bars; lobes $\frac{1}{8}$–$\frac{1}{6}$ in.; triangular. *Fruit* not seen.—This seems closely allied to *A. miniata*, but the petioles, peduncles and calyx-teeth are much longer.

9. **A. Nuttallii,** *Clarke*; glabrous, leaves petioled obovate shortly acuminate entire, calyx-teeth $\frac{1}{5}$ in. triangular-lanceolate, corolla 1 in.

BHOTAN; *Nuttall*.

Branches round, stout. *Leaves* $5\frac{1}{2}$ by 3 in., suddenly narrowed at the apex into a short point, narrowed into the petiole, very coriaceous, nerves coarse deeply impressed on the upper surface; petiole $\frac{1}{4}$ in. *Peduncle* from below the leaves $1\frac{1}{2}$ in.; pedicels 1 in.; apex conspicuously cupped; bracts $\frac{1}{10}$ in.; corymb erect, lax, whole height 4 in. *Corolla* narrowly tubular, straight; lobes $\frac{1}{4}$ in., linear-lanceolate (appears in the dried state to have been red without transverse bars). *Fruit* not seen.

10. **A. Parishii,** *Clarke*; leaves petioled narrowly lanceolate, corymbs glabrous, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. triangular-lanceolate, corolla $\frac{3}{4}$–1 in.

BIRMA; Nat-toung expedition, *Parish*; Thoung-gyen, alt. 5000 ft., *Lobb*.

Branches not thick, round or scarcely angular. *Leaves* 5 by $1\frac{1}{4}$ in., narrowed at both ends, entire, coriaceous, glabrous, marginal nerve well defined; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Peduncle* $\frac{1}{8}$–$\frac{1}{3}$ in.; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., thickened upwards, cup little broader than the pedicel; bracts $\frac{1}{16}$ in. *Corolla* cylindric, slightly campanulate upwards, bright red, transverse bars very obscure in the dried examples; teeth $\frac{1}{6}$–$\frac{1}{4}$ in., triangular. *Fruit* not seen.—Near *A. salicifolia* (n. 6), but the leaves are distinctly petioled and wider, the pedicels longer, the flowers larger.

** *Corymbs subsessile or the pedicels fascicled or solitary*; *anthers granular, spurred on the beak* (except in *A. macrantha*).

11. **A. variegata,** *D. Don*; *G. Don Gen. Syst.* iii. 862, *not of DC. nor of Hook. f.*; leaves shortly petioled lanceolate narrowed at both ends, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. triangular-lanceolate glabrous, corolla $\frac{3}{4}$–1 in. A. pulcherrima *and* odontocera, *Hook. f. in Gen. Pl.* ii. 571. Thibaudia variegata, *Wall. Cat.* 751. T. pulcherrima, *Hook. in Bot. Mag.* t. 4303. Vaccinium odontocerum, *Wight Ic.* t. 1187. V. variegatum, *Kurz in Journ. As. Soc.* 1873, ii. 84 (as to spec. descr. only); *Kurz in Journ. As. Soc.* 1877, ii. 214; *For. Fl.* ii. 89. Caligula pulcherrima *and* odontocera, *Klotzsch in Linnæa*, xxiv. 28.

KHASIA MTS.; alt. 3–5000 ft., common. CACHAR, *Keenan.* CHITTAGONG HILLS. BRITISH BIRMA.

Branches thick, round, often covered with flowers for a great space below the leaves. *Leaves* towards the end of the branches, alternate, usually without flowers among them, 4–7 by 1–2 in., entire or toothed, glabrous, somewhat coriaceous; petiole 0–$\frac{1}{4}$ in. (on the same branch). *Pedicels* $\frac{3}{4}$ in., usually densely fascicled on very short spurs, thickened upwards in fruit, terminal cup scarcely wider than the pedicel. *Corolla* rose-purple, with very strongly marked V-shaped transverse bands; lobes $\frac{1}{4}$ in., lanceolate, green. *Anthers* with spurs on their beaks. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., very succulent, red to purple-black.

12. **A. macrantha,** *Hook. f. in Gen. Pl.* ii. 571; leaves shortly petioled lanceolate narrowed at both ends, calyx-teeth $\frac{1}{8}$ $\frac{1}{6}$ in. broadly lanceolate glabrous, corolla $1\frac{3}{4}$ in. Ceratostema variegatum, *Roxb. Fl. Ind.* ii. 413, *not of Griff.* Vaccinium variegatum, *Kurz in Journ. As. Soc.* 1873, ii. 84, var. *macrantha* only. Thibaudia macrantha, *Hook. in Bot. Mag.* t. 4566.

KHASIA and CHITTAGONG HILLS; *Roxburgh.* MOULMEIN; Kola Mts., *Lobb.*

Resembling the common *A. variegata*, and, according to Kurz l. c., only a var. thereof, but with much larger flowers, the corolla $1\frac{3}{4}$ by $\frac{1}{2}$–$\frac{3}{4}$ in. in Lobb's example, and 2 in. long in Roxburgh's description and (unpublished) drawings. The anthers have no spurs on the beak (as noticed by Hooker); these are always present in *A. variegata* and in *A. grandiflora.*

13. **A. loranthiflora,** *D. Don*; *G. Don Gen. Syst.* iii. 862; leaves nearly sessile very narrowly obovate-oblong, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. lanceolate hispid, corolla $1\frac{1}{4}$ in. Thibaudia loranthiflora, *Wall. Cat.* 754. Vaccinium loranthiflorum, *DC. Prodr.* vii. 554. V. verticillatum, β elegans, *Kurz in Journ. As. Soc.* 1877, ii. 214.

TAVOY; *Wallich.* PEGU; Yomah, alt. 3200 ft., *Kurz.* PROME HILLS; *Maingay*, n. 703.

Branches round, smooth. *Leaves* 5 by $\frac{1}{4}$ in., entire, approximate towards the ends of the branches; petiole 0 $\frac{1}{8}$ in. *Pedicels* $\frac{3}{4}$ in., hispid, rising among the terminal leaves, solitary or few and fascicled or very shortly corymbose. *Corolla* tubular, deep-red; teeth $\frac{1}{3}$ in., lanceolate, greenish. *Anthers* with spurs on the beak. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., subglobose, hirsute; calyx-teeth ultimately wide-triangular.

VAR. *glabrata*; pedicels and calyx-teeth nearly or quite glabrous.—Tenasserim, *Helfer* (Kew Distrib. n. 3477); Moulmein, *Lobb.*

14. **A. grandiflora,** *Hook. f. in Gen. Pl.* ii. 571; leaves subsessile oblong-lanceolate suddenly narrowed at the base, calyx-teeth $\frac{1}{6}$ in. triangular glabrous, corolla 2–$2\frac{1}{2}$ in. Ceratostema variegatum, *Griff. Notul.* iv. 302; *Ic. Pl. Asiat.* t. 502 (not good).

MISHMI MTS. and NAGA HILLS (south-east of Assam), *Griffith.*

Branches stout, round, smooth, leafy at the ends, flowering below the leaves. *Leaves* nearly sessile, 7 by 2 in., entire, glabrous, marginal nerve subprominent; base rounded.

Pedicels 1 in., stout, thickened upwards, cupped top prominent, in fascicles of 1–4 on the thick part of the branches. *Corolla* tubular, little widened upwards, red with transverse bars; teeth $\frac{1}{2}$ in., long-lanceolate. *Anthers* with spurs on the beak. *Fruit* not seen.—Kurz in Journ. As. Soc. 1877, ii. 214 unites this with *A. macrantha* (n. 11). Griffith's figure, though apparently taken from a specimen now at Kew, is not accurate as regards the leaf-base and petiole.

15. **A. angulata,** *Hook. f. in Gen. Pl.* ii. 571; leaves lanceolate acuminate narrowed to a short petiole, calyx-teeth $\frac{1}{12}$ in. shortly triangular glabrous, corolla 1 in. Ceratostema angulatum, *Griff. Notul.* iv. 302; *Ic. Pl. Asiat.* t. 503. Vaccinium odontocerum, *Kurz in Journ. As. Soc.* 1877, ii. 214, *not of Wight.*

PATKOY MTS., south-east of Assam, *Griffith* (Kew Distrib. n. 3471).

Very closely allied to *A. variegata*; the branches are more quadrangular; the leaves inflorescence and corolla undistinguishable; but the calyx-teeth are much shorter and more obtuse than in any of the examples of *A. variegata.*

SECT. III. *Corolla* tubular, lobed less than half its length, straight. *Peduncles* axillary, solitary, 1- (or 2-) flowered. *Leaves* small.

16. **A. obovata,** *Hook. f. in Gen. Pl.* ii. 572; leaves less than $\frac{1}{2}$ in. obovate obtuse entire, peduncles 1-flowered, corolla $\frac{1}{4}$ in. Vaccinium Sprengelii, *Wall. Cat.* 6296. V. obovatum, *Wight. Ic.* t. 1193. Vaccinii sp., *Griff. Notul.* iv. 300; *Ic. Pl. Asiat.* t. 517. Epigynium obovatum, *Klotzsch in Linnæa,* xxiv. 51.

KHASIA MTS.; alt. 3–5000 ft., frequent, *Griffith, H. f. & T.,* &c.

A small dense shrub. *Branches* rigid, terete, glabrous or patently hispid, densely leafy. *Leaves* glabrous, coriaceous, margins recurved. *Peduncles* $\frac{1}{2}$–$\frac{3}{4}$ in., scattered among the leaves, scarcely dilated at the apex. *Calyx-teeth* $\frac{1}{16}$ in., triangular-lanceolate, glabrous. *Corolla* acutely conical in the bud, deep-red, ultimately wide tubular, lobed nearly half its length. *Anther-beaks* spurred. *Capsule* $\frac{1}{6}$ in. diam., globose, ultimately dry. *Seeds* with the outer coat lax.—Resembling in habit and leaves the small-leaved *Vacciniums*; but the corolla (and the seeds) are of *Agapetes.*

17. **A. buxifolia,** *Nutt.*; *Hook. f. in Bot. Mag.* t. 5012; leaves 1 in. elliptic crenate, peduncles 1-flowered, corolla $\frac{3}{4}$ in.

BHOTAN; Duphla hills, *Nuttall*; Yeorsi, alt. 4500 ft., *Lister.*

A shrub, 3–4 ft. *Branches* virgate, round, pilose. *Leaves* obtuse, narrowed at the base, glabrous. *Peduncles* $\frac{1}{3}$ in., scattered among the leaves, pilose, little dilated at the apex. *Calyx-teeth* $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate, softly pilose. *Corolla* tubular, little widened upwards, bright-red; lobes $\frac{1}{4}$ in., lanceolate, paler or greenish. *Anthers* without spurs; filaments longer than usual in *Agapetes. Fruit* not seen.

18. **A. mitrarioides,** *Hook. f. ms.*; leaves $\frac{1}{2}$–$\frac{2}{3}$ in. ovate toothed shining, peduncles 2-flowered, corolla $\frac{3}{4}$–1 in.

MISHMI MTS., *Griffith* (Kew Distrib. n. 3466).

A small, much branched epiphyte. *Branches* rigid but slender, flexuous, round, hispid-pilose. *Leaves* hard, shining on both surfaces, acute, narrowed at the base, subpetioled; teeth rigid but few, shallow. *Peduncles* $\frac{3}{4}$ in., axillary, scattered, few, lax, pendent, minutely pilose or glabrous, bifurcate into 2 pedicels $\frac{3}{4}$ in. each; bracts inconspicuous. *Calyx-teeth* $\frac{1}{6}$ in., lanceolate, glabrous or most minutely pilose. *Corolla* tubular, hardly at all widened upwards, bright-red; lobes $\frac{1}{6}$–$\frac{1}{4}$ in., triangular. *Anthers* not spurred.—A species remote in habit from all others of the genus.

SECT. IV. *Corolla* straight, divided half way down or lower. *Flowers* corymbose or subfascicled.

19. **A. nana,** *Hook. f. in Gen. Pl.* ii. 571; leaves shortly petioled narrowly lanceolate, entire, cup at the apex of the pedicel deeply lobed, corolla $\frac{1}{4}$–$\frac{1}{3}$ in. lobed nearly to the base. Ceratostema nanum, *Griff. Notul.* iv. 303; *Ic. Pl. Asiat.* t. 105.

NAGA HILLS; *Griffith* (Kew Distrib. n. 3473).

Branches thick, round, glabrous. *Leaves* 3$\frac{1}{2}$ by 1 in., narrowed at both ends, glabrous, very coriaceous; petiole 0–$\frac{1}{5}$ in. *Peduncle* $\frac{1}{6}$–$\frac{3}{4}$ in.; pedicels, $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous, cup at their apex irregularly 8–12-toothed; bracts minute. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate, glabrous.—The enlarged base of the stem, shewn in Griffith's drawing, occurs in many of the species of Sects. I., II.

20. **A. Lobbii,** *Clarke*; leaves petioled lanceolate caudate-acuminate, corymbs 4 in. glabrous, corolla $\frac{3}{4}$–1 in. lobed much more than half-way down.

MOULMEIN; Thoung-gyun, alt. 5000 ft., *Lobb.*

Branches round, glabrous, leafy. *Leaves* 3$\frac{1}{2}$ by 1 in., narrowed at the base, entire, coriaceous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Corymbs* from the axils of the leaves, numerous, large, lax, glabrous; peduncle $\frac{1}{4}$–$\frac{1}{2}$ in.; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in., cup at the apex entire not large; bracts $\frac{1}{16}$ in. *Calyx-teeth* $\frac{1}{6}$ in., lanceolate-subulate, glabrous. *Corolla* narrowly-tubular in bud, crimson with a white top (Lobb), lobes $\frac{1}{2}$–$\frac{3}{4}$ in., linear. *Anthers* not spurred. *Fruit* not seen.—Much resembling *A. saligna* (n. 5) in the leaves and corymbs; the deeply divided corolla entirely differing.

21. **A. pilifera,** *Hook. f. ms.*; leaves short-petioled elliptic caudate-acuminate, pedicels subfascicled hairy, corolla $\frac{1}{4}$ in.

KHASIA MTS.; Pomrang, alt. 4000 ft., *H. f. & T.* MISHMI MTS., alt. 4000 ft., *Griffith* (Kew Distrib. n. 3455).

Branches round, slender, sparsely hairy. *Leaves* 3 by 1$\frac{1}{2}$ in., suddenly narrowed into the caudate point, base rounded, entire, membranous, glabrous or with scattered hairs; petiole $\frac{1}{6}$ in., hairy. *Pedicels* 1–4 fascicled in the axils, 1 in., hairy, scarcely thickened upwards. *Calyx* of 5 ovate short acute lobes. *Corolla* tubular, lobes oblong acute. *Anthers* spurred on the beak. *Fruit* not seen.

22. **A. bracteata,** *Hook. f. ms.*; leaves shortly petioled elliptic caudate-acuminate, corymbs lax, pedicel with leaf-like bracts $\frac{1}{4}$–$\frac{1}{2}$ in., corolla $\frac{1}{3}$–$\frac{1}{2}$ in.

MOULMEIN; Thoung-gyun, alt. 5000 ft., *Lobb, Parish.*

Branches slender, round or somewhat angular, glabrous, pilose towards the tips. *Leaves* 2 by $\frac{3}{4}$ in., broadly cuneate or almost rounded at the base, entire, coriaceous, glabrous; petiole $\frac{1}{6}$ in., hairy. *Corymb* 2 in., peduncle $\frac{1}{4}$ in.; pedicels $\frac{1}{4}$–$\frac{1}{2}$, hairy, scarcely thickened upwards; bracts broadly lanceolate, usually longer than the pedicels. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate, glabrous or nearly so. *Corolla* narrowly tubular-conic in bud, white and purple (Lobb), lobed more than half way down; lobes recurved, apparently linear. *Anthers* spurred on their beaks. *Fruit* not seen.

23. **A. discolor,** *Clarke*; glabrous, leaves subpetioled oblong narrowed at both ends toothed white beneath, calyx-limb campanulate, lobes $\frac{1}{5}$ in. ovate-lanceolate, corolla scarcely $\frac{1}{2}$ in. divided nearly to the base.

SIKKIM HIMALAYA; Teniv Lampa, alt. 3500 ft., *King.* PATKOY MTS.; *Griffith* (Kew Distrib. n. 3463). BHOTAN; Duphla Hills, *Nuttall.*

Branches round, somewhat slender, uniformly leafy. *Leaves* 1$\frac{3}{4}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., acute, tapering at the base, coriaceous. *Peduncles* $\frac{1}{4}$ in., axillary; pedicels $\frac{3}{4}$ in., thickened upwards, top cupped. *Calyx-tube* at base very much wider than the corolla (at flowering time). *Corolla* exceedingly narrowed upwards, the reflexed lobes linear. *Anthers* not spurred. *Fruit* $\frac{1}{5}$ in. diam., globose, narrower upwards; the long calyx-teeth erect.

SECT. V. *Corolla* widely campanulate, straight, lobed much less than half its length. *Corymbs* shortly peduncled.

24. **A. campanulata,** *Clarke*; leaves subsessile elliptic narrowed at both ends, calyx-limb shallowly 5-lobed, corolla $\frac{3}{4}$ by $\frac{1}{2}$ in. Vaccinium campanulatum, *Kurz in Journ. As. Soc.* 1873, ii. 85, 1877, ii. 214, and *For. Fl.* ii. 89.

MARTABAN; Nattoung, alt. 7000 ft., *Kurz*. MOULMEIN; *Parish*.

Branches thick, round, glabrous, tips leafy. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$–$1\frac{1}{2}$ in., acute not acuminate, entire, glabrous, coriaceous. *Corymbs* from the naked branches, glabrous; peduncles $\frac{1}{4}$ in.; pedicels $\frac{1}{3}$ in., thickened upwards; bracts $\frac{1}{12}$ in. *Calyx-limb* lobed hardly half way down. *Corolla* gradually widened upwards from a campanulate base, deep scarlet; lobes $\frac{1}{6}$–$\frac{1}{4}$ in., broadly triangular, acute. *Anthers* spurred on their beaks. *Fruit* not seen.

SPECIES IMPERFECTLY KNOWN.

25. A. LINEARIFOLIA, *Clarke*; glabrous, leaves long linear entire petioled, corymbs peduncled, calyx-teeth $\frac{1}{6}$ in. lanceolate.

MISHMI; Thumath summit, *Griffith* (Kew Distrib. n. 3480).

Griffith's fragments are without flowers. *Branches* round, uniformly leafy. *Leaves* 6 by $\frac{1}{4}$–$\frac{1}{3}$ in., entire, coriaceous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$–$\frac{3}{4}$ in.; pedicels 6–8 or more, $\frac{1}{2}$ in., thickened upwards, top cupped.—Peduncles, pedicels and calyces fleshy, rose-coloured (Griffith).

26. A. GRIFFITHII, *Clarke*; glabrous, leaves petioled oblong suddenly caudate acuminate entire, peduncles long axillary, calyx-teeth $\frac{1}{8}$ in. ovate acute.

MISHMI OF PATKOYE MTS., *Griffith*.

Griffith's example is in young bud. *Branches* round, uniformly leafy. *Leaves* $5\frac{1}{2}$ by $1\frac{3}{4}$ in., with parallel sides, suddenly narrowed into a short tail at the apex, base cuneate, coriaceous; petiole $\frac{1}{5}$ in. *Peduncle* 1 in., axillary; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., thickened upwards, articulate under the flowers; bracts $\frac{1}{12}$ in.

2. PENTAPTERYGIUM, *Klotzsch*.

Shrubs often epiphytic, stems often greatly thickened at the base. *Leaves* alternate, ovate or lanceolate, toothed or subentire, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, corymbose, fascicled or solitary; pedicels thickened upwards, cupped and articulate under the ovary; bracts small. *Calyx-tube* 5-angled or -winged; lobes 5, enlarged in fruit. *Corolla* tubular, shortly 5-lobed, rose or red with transverse marks, or yellow. *Stamens* 10, epigynous, filaments short; anthers elliptic, produced upwards in 2 long beaks opening by terminal pores or slits, beaks often 2-spurred behind. *Ovary* 5-celled or spuriously 10-celled; style cylindric, stigma subcapitate; ovules very many. *Berry* 5-winged, or distinctly 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* very many, ellipsoid, outer coat very lax.—Species 5, of the Eastern Himalaya and Khasia.

* *Leaves less than* $\frac{3}{4}$ *in., pedicels subsolitary, anthers without spurs on their beaks.*

1. **P. serpens,** *Klotzsch in Linnæa*, xxiv. 47; leaves elliptic-oblong subentire. Vaccinium serpens, *Wight Ill.* t. 141, D, fig. 2 and *Ic.* t. 1183; *Hook. f. Ill. Him. Pl.* t. 15, B. Thibaudia myrtifolia, *Griff. Notul.* iv. 301, and *Ic. Pl. Asiat.* t. 510.

SIKKIM and BHOTAN; alt. 3–8000 ft., *Griffith, J. D. H.*, &c.

Branches pendulous, hispid, densely leafy. *Leaves* subsessile, bifarious, $\frac{3}{8}$ by $\frac{1}{5}$ in., acute, rounded at the base, coriaceous, glabrous, margins recurved. *Pedicels* $\frac{1}{2}$–1 in.,

with patent glandular hairs. *Calyx-teeth* $\frac{1}{6}$ in., lanceolate, subobtuse, glandular-hairy, enlarged in fruit. *Corolla* $\frac{3}{4}$ by $\frac{1}{5}$ in., tubular, shortly lobed, hairy without, bright-red with transverse V-shaped marks. *Fruit* $\frac{1}{4}$ in. diam., turbinate-globose, conspicuously 5-winged.

** *Leaves 2–5 in., pedicels fascicled or corymbose. Anthers spurred on their beaks.*

2. **P. rugosum,** *Hook. f. in Bot. Mag.* t. 5198; leaves lanceolate serrate glabrous, corymbs short-peduncled few-flowered, corolla rose-red transversely marked. Gaylussaccia sp., *Griff. Itin. Notes,* 84, n. 1217. G. incurvata, *Griff. Ic. Pl. Asiat.* t. 506. G. serrata, *Griff. Itin. Notes,* 37, and n. 604 *in Herb., not* G. serrata, *Griff. Ic. Pl. Asiat.* t. 507.

BHOTAN and KHASIA MTS.; alt. 3–7000 ft., *Griffith, H. f. & T.,* &c.

Branches stout, hirsute towards the extremities. *Leaves* subsessile, 4 by $1\frac{1}{4}$ in., acute, base obtuse or rounded, coriaceous, rugose with impressed nerves, margins often recurved. *Peduncle* $\frac{1}{4}$ in.; pedicels $\frac{3}{4}$–$1\frac{1}{2}$ in., hairy or glabrescent; bracts $\frac{1}{12}$ in. *Calyx-lobes* in early flower $\frac{1}{5}$ in., lanceolate or scarcely triangular; in early fruit enlarged, elliptic or ovate, foliaceous, overlapping at the margins, appearing decurrent down the young fruit and produced beneath it; in ripe fruit again less prominent, triangular, scarcely overlapping. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., tubular, shortly lobed, glabrous, white or rose, with red transverse V-shaped marks. *Berry* $\frac{1}{3}$ in. and more, widely hemispheric, 5-ribbed, hardly 5-gonal.

3. **P. Listeri,** *King ms.*; leaves elliptic-oblong acute subentire glabrous not rugose beneath, corymbs small very short-peduncled, corolla small rose-red.

BHOTAN; Duphla Hills, alt. 7000 ft., *Lister.*

Branches stout, angular towards the extremities. *Leaves* subsessile $3\frac{1}{4}$ by $1\frac{1}{4}$ in., obtuse, shortly cordate at the base, nerves (primary and secondary) elevated on the upper surface. *Peduncles* from beneath the leaves, $\frac{1}{8}$–$\frac{1}{6}$ in.; pedicels 2–3, $\frac{1}{4}$ in.; bracts $\frac{1}{16}$ in. *Calyx-lobes* $\frac{1}{6}$ in., broadly elliptic, obtuse in bud. *Corolla* (in bud) $\frac{1}{3}$–$\frac{1}{2}$ in long.—Closely allied to *P. rugosum* and as though a starved form of it with depauperated corymbs and small flowers; but the texture and nervation of the leaves give it a widely different appearance.

4. **P. flavum,** *Hook. f. in Bot. Mag.* t. 4910; leaves elliptic acute subentire or slightly crenate glabrous or silky on the midrib beneath, pedicels densely fascicled hardly corymbose, corolla yellow.

BHOTAN; Duphla Hills, *Nuttall.*

Branches round, pubescent towards the extremity. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{3}$ in., rounded at the base, coriaceous, rugose, obscurely crenate; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Pedicels* $\frac{3}{4}$ in., pilose, thickened upwards, densely fascicled on very short spurs; bracts $\frac{1}{8}$ in., lanceolate; pedicels and calyx-tube corolloid, yellowish (in the Kew picture). *Calyx-lobes* in flower $\frac{1}{3}$ in., elliptic-lanceolate, striate, pilose. *Corolla* $\frac{2}{3}$ by $\frac{1}{3}$ in., tubular, inflated in the middle, shortly lobed, pubescent without, yellow. *Berry* $\frac{1}{3}$ in. diam. and upwards, crowned by the spreading narrowly lanceolate acute calyx-teeth.

5. **P. Hookeri,** *Clarke*; leaves elliptic acute crenate or serrate glabrous or hairy on the midrib beneath, pedicels fascicled or hardly corymbose, corolla yellow.

SIKKIM; alt. 5–8000 ft., *J. D. H., Treutler,* &c., frequent. BHOTAN; *Nuttall.*

Intermediate between *P. rugosum* and *P. flavum*; the dried examples are (from the serrated leaves) always arranged under *P. rugosum*, but the corolla is a clear yellow or (when young) a greenish-yellow. The calyx lobes in the buds are larger and more obtuse than in any flowering or fruiting example of *P. rugosum*; the pedicels are subfascicled; nevertheless, it appears really more allied to *P. rugosum* than to *P. flavum.*

3. **VACCINIUM,** *Linn.*

Shrubs, sometimes epiphytic. *Leaves* alternate, from lanceolate to ovate, entire or serrate, sometimes falsely whorled. *Flowers* usually small, axillary or terminal, racemed fascicled or corymbose rarely solitary, usually bracteate and 2-bracteolate. *Calyx-tube* globose; teeth 5, small. *Corolla* tubular or ovoid, 5-lobed, white, rose or yellow-green. *Stamens* 10, epigynous, free; anthers oblong, produced at the apex into 2 cylindric tubes with terminal slits or spurs (tubes very short in *V. bancanum*). *Ovary* 5-celled, or falsely 10-celled; style cylindric, stigma simple; ovules few or several in each cell. *Berry* globose, crowned by the calyx-teeth; 5- (apparently 10-)celled. *Seeds* 1 or more in each cell, ellipsoid, compressed; testa firm, smooth.—Species 100, natives of the N. hemisphere and tropical mountains.

The Indian species all belong to the subgenus *Epigynium* (genus Klotzsch), and the foregoing generic character does not include some non-Indian subgenera.

* Leaves small, 1¼ in. or less (see also *V. Griffithianum*, n. 15).

1. **V. Nummularia,** *H. f. & T. ms.*; leaves ½ in. broadly elliptic obtuse subentire, racemes often clustered, calyx-teeth very short obtusely triangular.

SIKKIM and BHOTAN; alt. 8–10,000 ft., *Griffith, J. D. H.*, &c.

A small, rigid epiphyte; branches pendent, densely hirsute, almost bristly. *Leaves* subsessile, coriaceous, glabrous, margins recurved. *Racemes* 1–2 in., rose-coloured; rachis hairy; pedicels ¼ in., glabrous; bracts ⅕ in., elliptic, caducous. *Corolla* ⅕ by $\frac{1}{12}$ in., tubular, shortly lobed, glabrous, rosy. *Filaments* with long hairs; anthers dehiscing by slits below the apex, dorsal spurs very large. *Fruit* ⅕ in. diam., subglobose, crowned by the obscurely toothed calyx-limb.

2. **V. retusum,** *Hook. f. ms.*; leaves 1 in. obovate-oblong obtuse entire, racemes solitary or clustered, calyx-teeth very short obtusely triangular. Thibaudia retusa, *Griff. Notul.* iv. 300, and *Ic. Pl. Asiat.* t. 509.

SIKKIM and BHOTAN; alt. 7–9000 ft., *Griffith, J. D. H.*, &c.

A small epiphyte; branches pendent, pubescent upwards. *Leaves* often obtuse or emarginate, base attenuate, scarcely petioled, coriaceous, glabrous, margins recurved. *Racemes* white, 1–2 in., glabrous or the rachis pilose; pedicels ⅛–⅙ in.; bracts ¼–⅓ in., elliptic, caducous. *Corolla* ⅕ by ⅛–$\frac{1}{10}$ in., ovoid-tubular, shortly lobed, glabrous, white with 5 red stripes. *Filaments* with long hairs; anthers dehiscing by slits below the apex, dorsal spurs very large. *Fruit* ⅕ in. diam., subglobose, crowned by the obscurely-toothed calyx-limb.

3. **V. sikkimense,** *Clarke*; leaves 1 in. obovate-oblong acute serrulate, racemes short solitary or clustered, calyx-teeth very short obtuse nearly glabrous.

SIKKIM HIMALAYA; Lachen, alt. 13,000 ft., *J. D. H.*

A rigid, small shrub; branches pubescent upwards. *Leaves* subsessile, coriaceous, glabrous, margins recurved. *Racemes* only seen in bud; bracts ¼ in., elliptic, caducous. *Corolla* ⅕ in., lobed deeply. *Filaments* hairy; anthers dehiscing by long slits below the apex, not spurred. *Fruit* not seen.

4. **V. pumilum,** *Kurz in Journ. As. Soc.* 1873, ii. 85; leaves ¾–1 in. elliptic narrowed at both ends obtuse, racemes solitary pubescent, calyx-teeth lanceolate pubescent. *Kurz in Journ. As. Soc.* 1877, ii. 214, and *For. Fl.* ii. 90.

BIRMA: Martaban Hills, alt. 4–6000 ft., *Kurz, Brandis.*

A small, much-branched epiphyte; branches pubescent upwards. *Leaves* subsessile, obscurely crenate-serrate, coriaceous, glabrous, margins recurved. *Racemes* 1–2

in., pubescent-pilose; pedicels $\frac{1}{16}$–$\frac{1}{8}$ in.; bracts elliptic, white, caducous. *Calyx-tube* pilose, teeth $\frac{1}{12}$ in. *Corolla* $\frac{1}{5}$ in., oblong-urceolate, shortly lobed, glabrous without, rose-coloured. *Filaments* pilose; anthers spurred. *Berries* small, purple.

** Leaves 1½–8 in.

† *Racemes axillary, solitary or subumbellate from whorls of leaves.*

5. **V. serratum,** *Wight Ic.* t 1184; branchlets glabrous, leaves lanceolate serrate often whorled, peduncles mostly terminal umbelled not clothed with broad bracts at their bases, corolla glabrous without. Thibaudia serrata, *Wall. Cat.* 6299. Ceratostemma vacciniaceum, *Roxb. Fl. Ind.* ii. 412. Gaylussaccia serrata, *Lindl. in Royle Ill.* 257, t. 79, fig. 2; *DC. Prodr.* vii. 558. Agapetes serrata, *G. Don Gen. Syst.* iii. 862. Epigynium serratum, *Klotzsch in Linnæa,* xxiv. 50.

SIKKIM, BHOTAN and KHASIA MTS.; alt. 3–7000 ft., frequent.

A stout epiphyte; branches often greatly thickened at their base. *Leaves* subsessile, 2½ by ¾ in., acute, remotely crenate-serrate nearly to the base, glabrous. *Racemes* 2 in., often 3–4 springing umbellately from the terminal whorl of leaves, glabrous or nearly so; bracts $\frac{1}{10}$ in., lanceolate, serrate, those at the base of the peduncles hardly larger. *Calyx-tube* smooth; teeth minute, triangular. *Corolla* ¼ by $\frac{1}{8}$ in., tubular, very shortly lobed, yellow-green. *Filaments* glabrous; anthers not spurred, dehiscing by long slits from below the apex. *Berry* $\frac{1}{5}$ in. diam., globose, glistening, white or yellowish.

VAR. *leucobotrys*; leaves elliptic acute from a broad or almost rounded base. Epigynium leucobotrys, *Nutt.*; *Bot. Mag.* t. 5103. BHOTAN; Duphla Hills, *Nuttall.*

VAR. *Nuttallii*; leaves 7 by 2¼ in. crenate (not serrate) rugose with nerves impressed on the upper surface.—Bhotan, *Nuttall.*—This may be specifically distinct, the leaves differing very much both in size and texture.

6. **V. venosum,** *Wight Ic.* t. 1185; branchlets glabrous, leaves lanceolate crenate-serrate, peduncles mostly terminal umbelled clothed with numerous imbricated elliptic bracts at their bases, corolla puberulous without. Epigynium venosum, *Klotzsch in Linnæa,* xxiv. 50.

MISHMEE; Thumatha summit, *Griffith* (Kew Distrib. n. 3461). KHASIA MTS.; *Griffith.*

A stout, glabrous epiphyte; branches round. *Leaves* 3½ by ¾–1 in., acute, suddenly narrowed to the very short petiole, remotely crenate-serrate nearly to the base, coriaceous. *Racemes* 2–3 in.; pedicels $\frac{1}{6}$–¼ in.; bracts as long as the pedicels, elliptic, caducous, the lowest persistent. *Calyx-tube* rough with circular glands; teeth small, acute. *Corolla* $\frac{1}{5}$ by $\frac{1}{10}$ in., ovoid-conic. *Filaments* glabrous; anthers without spurs, dehiscing by long slits below the subentire apex. *Fruit* not seen.

VAR. *hispida*; branchlets hispid-pilose upwards, leaves often smaller. Gaylussaccia serrata, *Griff. Ic. Pl. Asiat.* t. 507, *not of Lindl.*—Sikkim and Bhotan, alt. 4–7000 ft., frequent, *Griffith, J. D. H.,* &c., frequent.—Leaves varying much in size and texture, in the Alpine examples only 1½ in. long, in Nuttall's examples herbaceous, little coriaceous, in Griffith's examples greatly resembling those of *V. serratum. Berries* $\frac{1}{6}$ in. diam., globose.

7. **V. ardisioides,** *Hook. f. ms.*; glabrous, leaves sessile elliptic acuminate entire, peduncles umbelled in the terminal whorl of leaves without imbricate bracts at their base, corolla glabrous without.

MOULMEIN; Thoung-gyun, alt. 6000 ft., *T. Lobb*; Nattoung expedition, *Parish.*

Branches 2 ft., naked, with terminal whorls of leaves. *Leaves* closely sessile, 4½ by 1½ in., rounded at the base, coriaceous. *Racemes* coloured, 2–3 in.; pedicels ¼–½ in., thickened upwards; bracts $\frac{1}{5}$ in., linear-lanceolate. *Calyx* glabrous, limb shortly campanulate, obscurely 5-pointed. *Corolla* ¼ by $\frac{1}{8}$ in., ovoid-conic, deeply lobed. *Filaments* glabrous; anthers spurred, opening by long slits from the subentire apex. *Fruit* not seen.

8. **V. Dunalianum,** *Wight Ic.* t. 1194; glabrous, leaves subpetioled oblong-lanceolate caudate-acuminate entire, racemes axillary solitary, corolla glabrous without. Epigynium Dunalianum, *Klotzsch in Linnæa,* xxiv. 31. Thibaudia revoluta, *Griff. Ic. Pl. Asiat.* t. 513.—Thibaudiacea, *Griff. Itin. Notes* 152, n. 752.

SIKKIM, BHOTAN and KHASIA MTS, alt. 3–8000 ft., frequent.

A large, erect shrub; branches angular, uniformly leafy. *Leaves* 4 by 1–1¼ in., the linear point often nearly 1 in., base cuneate, coriaceous, margins recurved. *Racemes* 1–3 in.; pedicels ⅙–¼ in.; bracts round-ovate, margins scarious, densely imbricate, a few persistent at flowering-time, usually deciduous before fruiting. *Calyx-teeth* small, triangular. *Corolla* ⅕ in., ovoid-conic. *Filaments* glabrous; anthers spurred, dehiscing by slits at their subentire apex. *Berry* ⅙ in. diam., globose.

9. **V. gualtheriæfolium,** *Hook. f. ms.*; glabrous, leaves large shortly petioled elliptic acute remotely crenate-serrate, racemes axillary solitary. Thibaudia gualtheriæfolia, *Griff. Ic. Pl. Asiat.* t. 512.—Thibaudiacea, *Griff. Itin. Notes,* 136, n. 590.

BHOTAN; banks of the Koollong, *Griffith* (Kew Distrib. n. 3468/1). SIKKIM; Catsuperri Lake, alt. 7000 ft., *J. D. H.*

A shrub, 8 ft. high; branches compressed. *Leaves* 4½ by 2 in., rhomboid or rounded at the base, coriaceous, nerves impressed above, glaucous-white beneath; petiole ⅛–⅙ in. *Racemes* 2–3 in.; pedicels ½ in. *Berries* ¼–⅓ in. diam., globose, blue-black.—Griffith's examples are in advanced fruit, showing no trace of bracts; corolla unknown.

10. **V. glauco-album,** *Hook. f. ms.*; glabrous, leaves obovate-oblong acute closely mucronate-serrate, racemes axillary dense with large white subpersistent bracts and bracteoles.—Thibaudia, *Griff. Itin. Notes,* 154, n. 762.

SIKKIM HIMALAYA; Lachen and Lachoong, alt. 9–10,000 ft., *J. D. H.* BHOTAN; Tongsa, alt. 7500 ft., *Griffith* (Kew Distrib. n. 3478).

A shrub; branches angular. *Leaves* 2½ by 1–1¼ in., not acuminate, base cuneate, coriaceous, nerves impressed above, white beneath; petiole 0–⅛ in. *Racemes* 2–3-in.; pedicels ⅛–¼ in.; bracts ½–¾ by ⅙–⅓ in., extending to the top of the raceme, and often persistent till the fruit is ripe; bracteoles 2–1 on each pedicel, ⅙–⅓ in., linear-lanceolate, resembling the bracts. *Calyx-teeth* minute, triangular. *Corolla* ¼–⅓ in., ovoid-conic, white tinged pink (J. D. H.). *Filaments* densely hairy; anthers long-spurred, dehiscing by long slits from the subentire apex. *Berry* ⅕ in. diam., globose.

11. **V. arbutoides,** *Clarke*; leaves large ovate acuminate entire glabrous, racemes axillary solitary pilose, calyx-teeth ⅛ in. lanceolate pilose.

SOUTH-EAST ASSAM; PATKOY MTS.; *Griffith* (Kew Distrib. n. 3469).

A stout shrub; branches glabrous. *Leaves* 5 by 2½ in., suddenly acuminate, base rhomboid or rounded, very coriaceous; petiole ⅛–⅕ in., very stout. *Racemes* 2½ in; pedicels ⅙ in.; bracts caducous. *Calyx-tube* subglobose, densely pilose; teeth erect, somewhat striate.—Neither corolla nor fruit seen; unmistakeable as a species, and (almost without doubt) of this genus.

†† *Racemes alternate, corymbose or subcorymbose towards the ends of the branchlets.*

12. **V. Donianum,** *Wight Ic.* t. 1191; glabrous, leaves lanceolate or oblong acuminate, bracts linear or very narrowly lanceolate caducous, pedicels and calyx glabrous, anthers spurred. *Kurz in Journ. As. Soc.* 1877, pt. ii. 215 (exclud. var. β) and *For. Fl.* ii. 91. V. affine, *Wight Ic.* t. 1190. Thibaudia Sprengelii, *Wall. Cat.* 6298. Agapetes Sprengelii, *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 555. Epigynium Donianum, Sprengelii *and* affine, *Klotzsch in Linnæa,* xxiv. 51, 50.

KHASIA MTS.; alt. 3–5000 ft., common. PEGU; alt. 3–6000 ft., frequent.

An erect shrub; branches round, not thick. *Leaves* 2½ by ½–1 in., subsessile, narrowed at both ends, minutely crenate-serrate, nerves distinct beneath. *Racemes* 1–4 in.; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in.; bracts ¼ by $\frac{1}{12}$ in. (or narrower), usually caducous; bracteoles linear, caducous. *Calyx-teeth* small, triangular. *Corolla* ¼ by ⅛ in., tubular, glabrous without. *Filaments* hairy; anthers opening by short slits from the crenulated apex. *Berry* ⅕ in. diam., globose or broader than long.

13. **V. malaccense,** *Wight Ic.* t. 1186; leaves shortly petioled lanceolate or elliptic narrowed at both ends, bracts linear or lanceolate caducous, pedicels and calyx pubescent, anther-spurs most minute. *Miq. Fl. Ind. Bat. Suppl.* 587. Epigynium malaccense, *Klotzsch in Linnæa,* xxiv. 50.

MALACCA; *Griffith, Lobb, Maingay.* SINGAPORE; *Schomburgk.*—DISTRIB. Java, Bangka.

An erect shrub; branchlets glabrous, angular, not thick. *Leaves* 2¼ by ¾–1 in., minutely crenate-serrate, nerves distinct beneath. *Racemes* 2–3 in., pubescent; pedicels ⅛–¼ in.; bracts ¼–⅓ by ⅛–⅙ in., caducous. *Calyx-teeth* minute, triangular. *Corolla* ⅕ by ⅛ in., ovoid-tubular, pubescent without. *Filaments* longer than in preceding species, glabrous in Wight's figure, with lax hairs in our examples; anthers with terminal crenate-serrate pores; spurs most minute in Wight's examples, wanting in some others. *Berry* ⅕ in. diam., globose.

VAR. *Lobbii*; racemes calyx and corolla glabrous, corolla rather larger. V. Donianum, var. β, *Kurz in Journ. As. Soc.* 1877, ii. 215.—Moulmein; Thoung-gyun, alt. 6000 ft., *Lobb.*

14. **V. bancanum,** *Miq. Fl. Ind. Bat. Suppl.* 587; leaves elliptic narrowed at both ends entire, racemes glabrous or minutely pubescent, anther-beaks very short or 0. V. exaristatum, *Kurz in Journ. As. Soc.* 1873, pt. ii. 86, 1877, pt. ii. 215, and *For. Fl.* ii. 91.

MARTABAN; *Kurz.* MALACCA; Mt. Ophir, *Maingay* (n. 699).—DISTRIB. Bangka.

An erect shrub; branches glabrous or minutely pubescent upwards. *Leaves* 2 by 1 in., obtusely acuminate, base cuneate almost petioled, coriaceous, glabrous, nerves beneath obscure. *Racemes* 1–3 in.; pedicels ⅓ in.; bracts narrow, caducous. *Calyx-tube* (in the Mt. Ophir plant) densely pilose; teeth minute, obtuse. *Corolla* ¼ by ⅛ in., glabrous without or nearly so; style much exserted. *Filaments* rather long, and (with the disk) very hairy; anther-cells oblong, opening by apical pores, hardly beaked. *Fruit* not seen.—The Bangka plant has the calyx-tube glabrescent. Some of the Mt. Ophir examples have much smaller and narrower leaves, 1¼ by ⅓ in. only.

15. **V. Griffithianum,** *Wight Ic.* t. 1192; leaves small oblong acute at both ends serrulate glabrous, racemes minutely pubescent, bracts leaf-like subpersistent, calyx sparsely minutely pilose teeth ovate acute dentate, corolla glabrous without. Epigynium Griffithianum, *Klotzsch in Linnæa,* xxiv. 51. Thibaudia camelifolia, *Griff. Notul.* iv. 301, and *Ic. Pl. Asiat.* t. 516.

KHASIA MTS.; alt. 3–5500 ft., frequent.—DISTRIB. South China.

An erect shrub, 6 ft. high; branches glabrous, pubescent towards the extremities. *Leaves* 1¼ by ¼–⅓ in., minutely acutely serrulate; petiole very short, often pubescent. *Pedicels* ⅛–¼ in.; bracts ½–⅕ in., some of the upper often persistent in fruit. *Calyx-teeth* $\frac{1}{16}$ in., often glandular-denticulate. *Corolla* ⅕ by $\frac{1}{10}$ in. *Filaments* hairy; anthers dehiscing by short apical slits, beaks spurred. *Berry* ⅕ in. diam., globose.

VAR. *glabrata*, H. f. & T.; innovations raceme and calyx glabrous or nearly so.—Khasia Mts.—This is, of all the Indian forms, that most like *V. bracteatum*, Thunb., with which Mr. Bentham has suggested (*Fl. Hongk.* 200) that perhaps *V. Donianum, Griffithianum* and *nilgherrense* might all be united.

16. **V. nilgherrense,** *Wight Ic.* t. 1189; leaves lanceolate acute at both ends crenate glabrous, bracts leaf-like subpersistent, calyx closely cinereous-

pubescent, teeth triangular acute entire, corolla pubescent without. Epigynium neilgherrense, *Klotzsch in Linnæa*, xxiv. 50.

NILGHERRY MTS.; alt. 4–8000 ft., frequent.

Closely resembling *V. Griffithianum*, differing in the points stated and in the larger leaves, 2½–3 by ½–⅔ in. *V. chinense*, Champ. in Hook. Kew Journ. iv. 297, does not appear to differ except by the wider ovate or oblong leaves.

17. **V. Leschenaultii**, *Wight Ic.* t. 1188; leaves ovate or oblong acute or obtuse minutely toothed glabrous, racemes pubescent, bracts caducous, anthers spurred. *Bedd. Fl. Sylv.* t. 277. Andromeda symplocifolia, *Wall. Cat.* 1522. Agapetes symplocifolia, *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 555. A. ? arborea, *DC. Prodr.* vii. 555. Epigynium Leschenaultii, *Klotzsch in Linnæa*, xxiv. 50.

MTS. of SOUTHERN INDIA and CEYLON; alt. 4–8000 ft., common.

The typical form of this species hardly differs from *V. Donianum*, n. 12, but by the pubescent innovations and racemes, the flowers and berries are rather larger. The leaves are 2–3 in. long, elliptic-lanceolate. The following varieties differ however considerably in general aspect.

VAR. *arborea*, Leschenault; arboreous, branchlets and racemes very stout nearly glabrous, pedicels ¼ in., berries ¼ in. diam. and upwards.

VAR. *rotundifolia*; leaves 1–1½ in. diam. orbicular obtuse sometimes retuse. *V. rotundifolia*, Wight Ill. t. 139; Bedd. For. Man. p. 136.—Ceylon.

VAR. *zeylanica*; bracts large leaf-like and as persistent as the leaves, so that the pedicels are axillary solitary.—Ceylon, *Thwaites*, &c. This remarkable plant appears to be a form of the var. *arborea*; the bracts (in Thwaites, n. 270) attain 1½ by ⅔ in. and are coriaceous; pedicels ⅓ in., stout, recurved in fruit; berries large. It is connected with *V. Leschenaultii* by intermediate forms having large but membranous subcaducous bracts.

4. CORALLOBOTRYS, *Hook. f.*

An epiphytic shrub; branches round. *Leaves* alternate, petioled, lanceolate, acuminate, obtusely serrate, coriaceous, base 2-glandular. *Peduncles* axillary, from below the leaves; flowers corymbose; pedicels thickened upwards, articulated and cup-shaped under the ovary; bracts very small. *Calyx-tube* hemispheric; lobes 5, small, triangular, persistent. *Corolla* small, globose-campanulate, red; teeth 5, small, recurved. *Stamens* 10, epigynous, free; anthers oblong, produced into 2 short tubes upwards, dehiscing by short terminal slits. *Ovary* 5-celled; style cylindric, somewhat thickened in the middle, stigma capitate; ovules numerous in each cell. *Fruit* unknown.

C. acuminata, *Hook. f. in Gen. Pl.* ii. 575. Thibaudia acuminata, *Wall. Cat.* 6297. Agapetes acuminata, *G. Don Gen. Syst.* iii. 862; *DC. Prodr.* vii. 554. Epigynium acuminatum, *Klotzsch in Linnæa*, xxiv. 51; *Bot. Mag.* t. 5010. Vaccinium acuminatum, *Kurz in Journ. As. Soc.* 1877, pt. ii. 214, and *For. Fl.* ii. 90.

KHASIA MTS.; alt. 3–4000 ft., *Wallich, Griffith, H. f. & T.*, &c. BHOTAN, *Nuttall.* ? PEGU, *Griffith.*

A shrub, 2–4 ft.; branches thick. *Leaves* 5 by 1½ in., sometimes 10 by 2¾ in.; base cuneate, glabrous; petiole ⅙–⅔ in. *Corymbs* red; peduncle ⅙–⅓ in.; pedicels ½ in.; bracts $\frac{1}{16}$ in. *Calyx-tube* cinereous pubescent or glabrous; teeth $\frac{1}{16}$ in. *Corolla* ⅕ by ⅛ in., glabrous or glandular-puberulous without. *Filaments* short, sparsely pilose; anther-cells glandular-scabrid.

ORDER LXXXII. **ERICACEÆ.** (By C. B. Clarke.)

Shrubs, trees or perennial herbs. *Leaves* alternate or apparently whorled, entire or serrate; stipules 0. *Flowers* racemed, clustered or solitary; pedicels bracteate and often 2-bracteolate. *Flowers* regular, or in *Rhododendron* sometimes irregular, sometimes dimorphic. *Calyx* free (or in *Diplycosia* sometimes much adnate to the ovary), 5- (rarely 4–6-)fid or 5-partite. *Corolla* hypogynous, often campanulate or urceolate, sometimes deeply lobed or (in *Pyrola*) petals free; lobes 5–20. *Stamens* 10, vary 5, 8 or 20, hypogynous or slightly attached to the base of the corolla (in *Diplycosia* sometimes epigynous); filaments free; anthers oblong, opening by pores or slits at the apex (in *Diplarche* by longitudinal slits), the cells often produced upwards into tubes, sometimes dorsally spurred. *Ovary* 5- (or 4–16-)celled; style cylindric; stigma simple or shortly lobed; ovules many in the inner angles of the cells, or placenta often pendulous from the upper angle. *Fruit* capsular, loculicidally or septicidally 5-valved; in *Gaultheria* and *Diplycosia* enclosed by the enlarged succulent calyx, appearing baccate. *Seeds* many (rarely few) in each cell, albuminous; testa close or loose or produced.—Species 1000, in all parts of the globe.

TRIBE I. **Andromedeæ.** *Corolla* gamopetalous. *Capsule* loculicidally 5-valved.

* *Calyx in fruit succulent, surrounding the capsule.*

Anthers with 2 horns on their back . . . . 1. GAULTHERIA.
Anthers without horns on their back . . . . 2. DIPLYCOSIA.

* *Calyx in fruit unaltered.*

† *Flowers fascicled or solitary.*

Leaves very small, densely imbricated, adpressed to the stem . 3. CASSIOPE.
Leaves petioled, clustered at the ends of the branches . . . . 6. ENKIANTHUS.

† *Flowers racemed.*

Seeds linear-oblong, not margined . . . . 5. PIERIS.
Seeds orbicular-compressed margined . . . . 4. LEUCOTHOE.

TRIBE II. **Rhodoreæ.** *Corolla* gamopetalous. *Capsule* septicidal.

Anthers opening by longitudinal slits . . . . 7. DIPLARCHE.
Anthers opening by terminal pores . . . . 8. RHODODENDRON.

TRIBE III. **Pyroleæ.** *Corolla* polypetalous. Herbs.

Flowers racemose. Capsule loculicidal, dehiscing from the base. 9. PYROLA.

1. **GAULTHERIA,** *Linn.*

Shrubs, erect or procumbent. *Leaves* persistent, alternate, serrulate. *Flowers* small, sometimes dimorphic; racemose or axillary and solitary; bracteate and 2-bracteolate. *Calyx* ovoid, 5-fid, in fruit enlarged coloured succulent and enclosing the capsule. *Corolla* ovoid-tubular, greenish-white or reddish; teeth small, recurved. *Stamens* 10; filaments more or less dilated, pilose; anther-cells more or less produced upwards, dorsally 1–2-horned; in the dimorphic flowers the stamens are small with simple anthers. *Ovary* 5-celled; style cylindric, stigma simple; ovules many in each cell. *Capsule* 5-celled, loculicidally 5-valved from the apex. *Seeds* many, minute, subglobose, obtusely angled.—Species 90, mostly American, a few in New Zealand, Australia, Malaya and Eastern Asia.

* *Small, procumbent, leaves less than* $\frac{3}{4}$ *in. long, flowers axillary solitary.*

1. **G. nummularioides,** *Don Prodr.* 150; stem prostrate hirsute, leaves ovate from a rounded base, anther-cells shortly produced 2-horned at the apex. *Wall. Cat.* 1524; *Royle Ill.* 260, t. 63, fig. 2. G. repens, *Blume Bijd.* 857; *DC. Prodr.* vii. 593. G. Nummulariæ, *DC. Prodr.* vii. 592. Gaultheria sp., *Griff. Ic. Pl. Asiat.* t. 518, fig. 2. Pernettya repens, *Zoll.*; *Miq. Fl. Ind. Bat.* ii. 1054.

Throughout the HIMALAYA; alt. 5–9000 ft.; and KHASIA MTS., alt. 4–6000 ft. frequent.—DISTRIB. Java.

Covering banks closely with its much-branched, densely leafy stems. *Leaves* $\frac{1}{2}$ by $\frac{1}{3}$ in., acute, minutely petioled, subentire, glabrous above, setulose beneath and frequently on the margin. *Pedicels* $\frac{1}{10}$ in., densely clothed with coriaceous glabrous ovate-oblong bracts $\frac{1}{6}$ in. long. *Calyx-teeth* $\frac{1}{8}$ in., lanceolate. *Corolla* $\frac{1}{5}$ by $\frac{1}{6}$ in., wide, tubular, reddish or nearly white, lobes minute. *Capsule* $\frac{1}{6}$ in. diam., succulent; calyx blue-black.

2. **G. trichophylla,** *Royle Ill.* 260, t. 63, fig. 3; stems prostrate more or less hirsute upwards, leaves oblong from a cuneate base, anther-cells not produced upwards, with a spreading spur below the pore. *DC. Prodr.* vii. 592.

ALPINE HIMALAYA; alt. 10–13,000 ft.; from LAHUL, *Jaeschke*, to SIKKIM, *J. D. H.*

Stems wiry, much branched, 6–12 in. *Leaves* $\frac{1}{4}$ by $\frac{1}{8}$ in., subsessile, entire or obscurely crenulate, glabrous on both surfaces, margins usually long-ciliate. *Pedicels* $\frac{1}{10}$ in., densely clothed by ovate bracts $\frac{1}{16}$ in. long. *Calyx-teeth* $\frac{1}{10}$ in., ovate-oblong. *Corolla* $\frac{1}{6}$ in. long and broad, wide campanulate, red or nearly white. *Capsule* $\frac{1}{5}$ in. diam.; succulent calyx blue-black.

** *Erect shrubs, leaves large (except* G. pyrolæfolia), *flowers racemed.*

3. **G. pyrolæfolia,** *Hook. f. ms.*; glabrous or the pedicels minutely pilose, leaves elliptic-obovate obtuse, anther-cells 2-horned at the apex.

SIKKIM; alt. 13,000 ft.; Lachen, *J. D. H.*; Mon Lepcha and Jongri, *J. D. H.*, *Clarke.*

Stems woody, suberect, 4–8 in. high. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$–1 in., narrowed at the base. crenate, glabrous or with few minute bristles. *Racemes* $1\frac{1}{2}$ in., 2–5-flowered; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in., lowest much the longest; bracts $\frac{1}{5}$ in. elliptic; bracteoles $\frac{1}{8}$ in., lanceolate, about the middle of the pedicel. *Calyx-teeth* very small, triangular. *Corolla* $\frac{1}{5}$ by $\frac{1}{8}$ in., ovoid. *Fruit* $\frac{1}{5}$ in. diam.; succulent calyx blue-black.

4. **G. fragrantissima,** *Wall. in As. Research.* xiii. 397, *with fig.*; branches glabrous, leaves lanceolate to ovate not acuminate, racemes more or less pubescent, bracteoles on the upper part of the pedicel, calyx-teeth ovate-lanceolate subacute. *DC. Prodr.* vii. 593; *Wall. Cat.* 765; *Wight Ic.* t. 1196; *Bot. Mag.* t. 5984; *Bedd. Fl. Sylv. Anal. Pl.* xix. fig. 1. G. fragrans, *Don Prodr.* 151. G. punctata, *Blume Bijd.* 856; *DC. l. c.* 593; *Kurz in Journ. As. Soc.* 1877, ii. 215 and *For. Fl.* ii. 92. G. ovalifolia, *Wall. Cat.* 1523. G. Leschenaultii, *DC. l. c.* 593; *Wight Ill.* t. 141, C. and *Ic.* t. 1195. Andromeda flexuosa, *Moon Cat. Pl. Ceyl.* 35. A. katagherensis, *Hook. Ic. Pl.* t. 246. Leucothoe ? katagherensis, *DC. l. c.* 606.

From NIPAL to BHOTAN; alt. 6–8000 ft., frequent. KHASIA MTS.; MTS. of BRITISH BIRMA, SOUTH INDIA and CEYLON, common.—DISTRIB. Malay Ind.

A stout shrub; branches more or less trigonous. *Leaves* 3 by 1–$1\frac{1}{2}$ in., shortly acute or subobtuse, base rhomboid, crenate-serrate, coriaceous, glabrous or sparingly hirsute from the punctations of the under surface; petiole $\frac{1}{16}$–$\frac{1}{6}$ in. *Racemes* 1–3 in.;

pedicels 0–$\frac{1}{4}$ in.; bracts $\frac{1}{6}$ in., and bracteoles $\frac{1}{8}$ in., ovate-lanceolate, the latter close to the ovary or more distant in the lower longer pedicels. *Calyx-teeth* $\frac{1}{12}$ in., usually acute in fruit. *Corolla* $\frac{1}{6}$ by $\frac{1}{8}$ in., widely tubular, nearly glabrous without, green, green-yellow or whitish. *Anther-cells* each with 2 terminal bristles. *Fruit* $\frac{1}{5}$ in. diam., brown hairy, surrounded by the deep-blue enlarged calyx.—Dimorphic flowers occur, with short stamens and anthers not produced upwards nor horned; see Wight's figures quoted above.

VAR. *racemosa*, Hook. f.; leaves lanceolate narrowed at both ends, racemes numerous 4–5 in. flexuose.—Sikkim, *J. D. H.*—Leaves 4½ by $\frac{3}{4}$ in., racemes very narrow, the uppermost pedicels $\frac{1}{4}$ in. with the bracteoles hardly above the middle.

VAR. *hirsuta*, Gardner ms. (sp.); branches bristly, leaves elliptic obtuse or rounded at both ends often bristly beneath.—Ceylon, alt. 6–7000 ft.; *Gardner, Thwaites*, &c.

5. **G. Hookeri,** *Clarke*; branches hispid, leaves elliptic not acuminate, racemes pubescent, bracts large, calyx-teeth ovate not acute.

SIKKIM; alt. 8–11,000 ft., Lachen and Choongtam, *J. D. H.*

A shrub, 6 ft. *Leaves* 2 by 1 in., suddenly or shortly acute, base usually rounded, serrate, punctate and usually bristly beneath; petiole 0–$\frac{1}{8}$ in. *Racemes* 1–2 in.; pedicels $\frac{1}{6}$ in.; bracts often $\frac{1}{4}$ in., elliptic; bracteoles $\frac{1}{8}$ in., elliptic, usually about the middle of the pedicel. *Calyx* nearly or quite glabrous. *Corolla* and *fruit* as in *G. fragrantissima* (Hooker, however, denotes the flowers as "pink and white").—This may be an alpine form of *G. fragrantissima*, analogous to var. *hirsuta*, of that species; but the bracteate racemes give it a different aspect.

VAR. *angustifolia*; leaves lanceolate 2¼ by $\frac{2}{3}$ in. narrowed at both ends.—Sikkim; Yakla, alt. 9–10,000 ft., *C. B. Clarke.*

6. **G. Griffithiana,** *Wight Ic.* t. 1197; branches glabrous, leaves oblong and elliptic caudate-acuminate closely serrulate, racemes pubescent, bracteoles often remote from the ovary, calyx-teeth ovate-oblong not acute on the fruit.

SIKKIM and BHOTAN; alt. 6–9000 ft. KHASIA MTS.; alt. 5–6000 ft., *Griffith, J. D. H.*, &c.

A stout shrub, branches round. *Leaves* 5 by 1½ in., base rhomboid, coriaceous, glabrous rarely sparsely hirsute from the punctations of the under surface; petiole $\frac{1}{4}$ in. *Racemes* 2–3 in.; pedicels $\frac{1}{4}$ in.; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., ovate; bracteoles $\frac{1}{12}$ in., ovate, often below the middle of the pedicels. *Calyx-teeth* usually obtuse, always less acute than in *G. fragrantissima*. *Corolla, stamens* and *fruit* as in *G. fragrantissima.*

2. DIPLYCOSIA, *Blume.*

Anther-cells without apical horns. Otherwise as *Gaultheria.*—DISTRIB. Species 10, Malayan.

The calyx is sometimes adnate more or less to the ovary; and in *D. semi-infera* (provisionally attached to the genus here) is at least semi-adnate in the young flower.

1. **D. microphylla,** *Beccari Malesia*, 212; leaves $\frac{1}{2}$–$\frac{2}{3}$ in. ovate subentire, pedicels axillary solitary 1-flowered. Vaccinium microphyllum, *Blume Bijd.* 851.

MALACCA; *Griffith, Lobb*; Mt. Ophir, *Maingay.*—DISTRIB. Malay Ids., Borneo, Philippines.

Habit of *Gaultheria nummularioides*. *Branches* hirsute. *Leaves* obtuse, base cuneate or round, coriaceous, sometimes 3-nerved, glabrous or sparsely hirsute beneath; petiole $\frac{1}{16}$ in. *Pedicels* $\frac{1}{8}$–$\frac{1}{4}$ in., glabrous; bracteoles connate under the ovary. *Calyx* free, widely campanulate; lobes wide-triangular, subobtuse. *Corolla* $\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., broadly tubular, red. *Anther-cells* produced upwards into tubes. *Fruit* not seen.

2. **D. discolor,** *Clarke*; branchlets scabrid-pilose, leaves ovate or elliptic narrowed at both ends serrate very white beneath, racemes pubescent, calyx-teeth ovate acute. Gaultheria discolor, *Nutt. in Bot. Mag.* t. 5034; *Belg. Hortic.* viii. (1858) 193, t. 52, fig. 2.

BHOTAN; Duphla Hills, *Nuttall.* MOULMEIN; Nattoung expedition, *Parish.*
Habit of *Gaultheria fragrantissima. Leaves* 2 by $\frac{3}{4}$–$1\frac{1}{4}$ in., glabrous, often 3-nerved to near the apex; petiole $\frac{1}{8}$ in. *Racemes* 2 in.; pedicels $\frac{1}{6}$ in.; bracts $\frac{1}{6}$ in., ovate-lanceolate, caducous; bracteoles $\frac{1}{8}$ in., lanceolate, usually close to the ovary, caducous. *Corolla* $\frac{1}{6}$ by $\frac{1}{8}$ in., ovoid, white, mouth red within. *Anther-cells* oblong, not produced at the apex, muticous or with 1 or 2 most minute points. *Fruit* nearly as of *G. fragrantissima* but rather smaller; calyx sometimes enlarged, blue-black, with ovate lobes; sometimes (in the same branch with ripe seeds) hardly altered, of 5 ovate spreading lobes, below and much shorter than the fruit.

3. **D.? semi-infera,** *Clarke*; branches scabrid, leaves oblong or ovate not acuminate, racemes pubescent, ovary half-inferior, calyx succulent closed over the fruit with erect linear teeth from the centre.—Vaccinioid. *Griff. Itin. Notes*, 127, nn. 484, 485.

BHOTAN; alt. 7–9000 ft, *Griffith* (Kew Distrib. n. 3482).
A stout shrub. *Leaves* $1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., base cuneate or rounded, crenate-serrate, coriaceous, glabrous, punctate beneath; petiole 0–$\frac{1}{8}$ in. *Racemes* 1–2 in., sometimes dense; pedicels $\frac{1}{16}$–$\frac{1}{6}$ in.; bracteoles small, usually close under the ovary. *Corolla* $\frac{1}{5}$ in., ovoid-conic. *Stamens* (in 2 of the few available flowers examined) small, irregular, imperfect, apparently corresponding to the stamens of the dimorphic flowers of *Gaultheria fragrantissima. Ovary* in the bud fully half-inferior; upper half conoidal, 5-ribbed, densely adpressed-pilose, containing the ovules. *Berry* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., globose, almost inferior; the depressed conical vertex opening by 5 hairy valves loculicidally. *Seeds* angular, as of *Gaultheria.*—This berry is quite unlike the fruit of *Gaultheria* and *Diplycosia* and probably indicates a new genus, which cannot be founded without better flowers for examination.

3. CASSIOPE, *D. Don.*

Small, fastigiate shrubs. *Leaves* small, rigid, densely imbricate, adpressed to the branches, entire or ciliate. *Pedicels* axillary, bracteate at the base only, curved in flower, erect in fruit. *Sepals* 5, free, thickened at the base, imbricate in bud; spreading and unaltered in fruit. *Corolla* campanulate, white or pink; lobes 5, short, recurved. *Stamens* 10 (or 8–12), slightly attached to the base of the corolla, filaments linear; anthers ovoid, truncate, with 1–2 horns divaricate from beneath the summit of each cell. *Ovary* 5-celled; style cylindric, stigma simple; ovules many in each cell. *Capsule* globose, apex depressed, loculicidally 5-valved. *Seeds* minute, long-ellipsoid, somewhat curved; outer coat of long, somewhat loose cells.—Species 10, in the frigid regions of the N. hemisphere.

1. **C. fastigiata,** *D. Don in Edinb. Phil. Journ.* xvii. (1834) 158; leaves $\frac{1}{5}$ in. ovate-oblong, pedicels 0–$\frac{1}{3}$ in. woolly. *DC. Prodr.* vii. 611; *Bot. Mag.* t. 4796. Andromeda fastigiata, *Wall. Cat.* 764, *and in Asiat. Research.* xiii. 394 and *Pl. As. Rar.* 51, t. 284; *Royle Ill.* 260, t. 63, fig. 1. A. cupressiformis, *Wall.*; *D. Don in. Mem. Wern. Soc.* iii. 411, and *Prodr.* 150.

ALPINE HIMALAYA; alt. 10–14,000 ft., common from Kashmir to Bhotan.
Forming dense tufts 6–12 in. high. *Leaves* somewhat 4-fariously imbricate, thickened on the back, ciliate. *Pedicels* 2–4-nate or solitary. *Sepals* $\frac{1}{8}$–$\frac{1}{6}$ in., elliptic, acute, nearly glabrous; margins scarious, often toothed. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., widely campanulate, white. *Filaments* glabrous or sparingly pilose; anthers truncate, each cell 1-horned.—"Heather" (of English travellers).

2. **C. selaginoides,** *H. f. & T. in Hook. Kew Journ.* vii. (1855) 126, t. 4; leaves $\frac{1}{8}$–$\frac{1}{6}$ in. elliptic-oblong, pedicels $\frac{1}{4}$–$1\frac{1}{4}$ in. woolly.

ALPINE SIKKIM; alt. 10–13,000 ft.; Lachen, *J. D. H.*; Jongri, *C. B. Clarke.*
Closely allied to *C. fastigiata* and hardly to be diagnosed by any technical character; but readily distinguishable by its much more slender stems and more elongate pedicels.

4. LEUCOTHOE, *D. Don.*

Glabrous shrubs. *Leaves* alternate, petioled, oblong or lanceolate. *Racemes* axillary and solitary or terminal and corymbose; pedicels bracteate and 1–2-bracteolate. *Calyx* 5-fid or -partite; segments open or imbricate in bud. *Corolla* urceolate, 5-fid, white. *Stamens* 10; anthers oblong, not horned on the back, sometimes aristate at the apex. *Ovary* 5-celled; style cylindric, stigma simple; ovules many. *Capsule* depressed-globose, loculicidally 5-valved. *Seeds* many, compressed, narrowly winged; testa laxly reticulate.—Species 7, North American, with 1 Japanese, 1 Himalayan.

L. Griffithiana, *Clarke*; leaves lanceolate acuminate at both ends subentire coriaceous, calyx-teeth triangular. Gaultheria sp., *Griff. Itin. Notes*, 138, n. 606 Pieris Griffithiana, *Hook. f. in Herb.*

BHOTAN; towards Sanah, alt. 6800 ft., *Griffith* (Kew Distrib. n. 3485).
A shrub; with lax, flexuose, pendent branches, and black-green leaves (Griffith). Griffith's examples (in late fruit) are altogether glabrous. *Leaves* $5\frac{1}{2}$ by $1\frac{3}{4}$ in., sometimes almost caudate-acuminate, entire or minutely acutely serrulate upwards, punctate beneath; petiole $\frac{1}{3}$ in. *Racemes* 3–5 in., axillary and corymbose at the ends of the branches, dense; pedicels $\frac{1}{5}$ in. *Calyx-teeth* $\frac{1}{16}$–$\frac{1}{12}$ in., subobtuse, united at the base. *Fruit* $\frac{1}{5}$ in. diam., depressed-globose, glabrous. *Seeds* $\frac{1}{20}$ in diam., orbicular, much compressed, outer coat white, margined by closely-placed long glistening scale-like papillæ.—Though the flowers are unknown, this plant (from the capsule and seeds) can belong to no known genus except *Leucothoe.*

5. PIERIS, *D. Don.*

Trees or shrubs; branches terete. *Leaves* alternate, petioled, persistent, entire or serrulate. *Racemes* axillary or panicled at the ends of the branches; pedicels bracteate and 1–2-bracteolate. *Calyx* 5-fid or -partite; segments open or valvate in the bud. *Corolla* ovoid; lobes 5, short, recurved. *Stamens* 10; filament with 2 horns divaricate from its apex (0 in *P. villosa*); anther-cells ovoid, truncate. *Ovary* globose, 5-celled; style cylindric, stigma capitellate; ovules very many in each cell. *Capsule* globose, loculicidally 5-valved. *Seeds* many, linear-oblong, falcate, not winged; testa loose.—Species 10; Himalaya, Birma, Japan and N.E. America.

1. **P. ovalifolia,** *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; leaves ovate or elliptic acute entire, calyx-teeth triangular-lanceolate, corolla pubescent without, filament 2-horned at the apex. *DC. Prodr.* vii. 599; *Loud. Arb. Brit.* 570, fig. 1070. Andromeda ovalifolia, *Wall. Cat.* 763 and *in Asiat. Research.* xiii. 391, *with fig.*; *Don Prodr.* 148; *Wight Ic.* t. 1199; *Cleghorn in Agri-Hort Soc. Calc. Journ.* xvi. 260, *with fig.*; *Brand. For. Fl.* 280; *Kurz in Journ. As. Soc.* 1877, pt. ii. 216 and *For. Fl.* ii. 92. A. elliptica, *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 126.—Thibaudia, *Griff. Ic. Pl. Asiat.* t. 514.

TEMPERATE HIMALAYA; alt. 3–8000 ft., from Kashmir to Bhotan, common. KHASIA MTS.; alt. 3–5000 ft., common. BRITISH BIRMA.—DISTRIB. Japan.
A tree, 20–40 ft., or shrub. *Leaves* 3–7 by 1–4 in., rounded at the base, glabrous or pilose beneath; petiole $\frac{1}{8}$–$\frac{1}{2}$ in. *Racemes* 4–10 in., simple, rarely (by the suppression of leaves towards the ends of the branches) appearing panicled, more or less pubes-

cent; pedicels $\frac{1}{8}$-$\frac{1}{3}$ in.; bracts $\frac{1}{5}$ in., lanceolate or linear. *Calyx-teeth* $\frac{1}{10}$-$\frac{1}{8}$ in., connate at the base. *Corolla* $\frac{1}{3}$-$\frac{1}{6}$ in., elongate-ovoid, white. *Capsule* $\frac{1}{6}$ in. diam., globose, glabrous. *Seeds* small, linear-oblong.

VAR. *lanceolata*; leaves narrower cuneate or sometimes almost acuminate at the base. P. lanceolata, *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; *DC. Prodr.* vii. 599. Andromeda lanceolata, *Wall. in Asiat. Research.* xiii. 390, *with fig.*; *Wight Ic.* t. 1198. A. squamulosa, *D. Don. Prodr.* 149.—Himalaya and Khasia.

2. **P. villosa,** *Hook. f. ms.*; leaves elliptic subobtuse entire villous beneath, calyx-teeth narrowly lanceolate, corolla pubescent without, filaments without horns at the apex. Andromeda villosa, *Wall. Cat.* 762.

ALPINE HIMALAYA; GURWHAL; alt. 10,000 ft., near Rogila, *Strach. & Winterb.* NIPAL; *Wallich.* SIKKIM; alt. 10–13,000 ft., Lachen and Tonglo, *J. D. H.*; Yakla, *C. B. Clarke.*

A small tree, closely resembling *P. ovalifolia* in leaves, flowers and fruit. The leaves are hardly more villous beneath than in some forms of *P. ovalifolia*; the calyx-teeth are very narrow downwards, only shortly connate; the corolla is rather wider; but it is definitely separated by the absence of horns at the apex of the filament.

3. **P. formosa,** *D. Don in Edinb. Phil. Journ.* xvii. (1834) 159; leaves lanceolate serrate glabrous, racemes panicled, calyx-teeth broadly lanceolate, corolla scarcely pubescent without. *DC. Prodr.* vii. 599. Andromeda formosa, *Wall. Cat.* 761 and *in Asiat. Research.* xiii. 395; *Don Prodr.* 149; *Wight Ic.* t. 1200; *Brand. For. Fl.* 280.—Gaultheria sp., *Griff. Itin. Notes,* 125 (n. 430), and *Ic. Pl. Asiat.* t. 517.

EASTERN HIMALAYA from NIPAL to BHOTAN; alt. 6-10,000 ft., *Wallich, Griffith, J. D. H.*, &c. ASSAM; Ghombunda Hills, *Simons.*

An evergreen, small, glabrous tree, 12 ft. *Leaves* 4 by 1–1$\frac{1}{4}$ in., acuminate, attenuated at base; petiole $\frac{1}{4}$ in. *Racemes* 2–4 in.; pedicels $\frac{1}{8}$-$\frac{1}{4}$ in.; bracts $\frac{1}{6}$ in., linear-oblong, caducous. *Calyx-teeth* $\frac{1}{8}$-$\frac{1}{6}$ in., acute, very coriaceous, valvate in bud. *Corolla* $\frac{1}{4}$ by $\frac{1}{6}$ in. ovoid, white. *Filaments* with 2 horns at the apex. *Capsule* $\frac{1}{4}$ in. diam., ovoid-globose, glabrous. *Seeds* many, linear-fusiform, subtriquetrous, testa very lax.

6. ENKIANTHUS, *Lour.*

Shrubs or small trees. *Leaves* petioled, entire or serrulate. *Flowers* terminal, umbelled or subcorymbose, pendulous or cernuous. *Calyx* free, 5-lobed. *Corolla* broadly campanulate; lobes 5, short, imbricated in bud, entire or laciniate. *Stamens* 10; anthers oblong, cells aristate on the back, dehiscing by very short slits in front. *Ovary* ovoid, 5-celled; style columnar, stigma simple; placentas pendent from the upper inner angles of the cells, many-ovuled. *Capsule* ovoid or oblong, woody or coriaceous, 5-celled, loculicidally 5-valved. *Seeds* few perfect (and often many imperfect) in each cell; testa crisped, membranous.—Species 5; E. Himalaya, China, Japan.

E. himalaicus, *H. f. & T. in Hook. Kew Journ.* vii. (1855) 126, t. 3; leaves ovate or elliptic serrulate, pedicels umbelled, corolla widely campanulate lobes entire, capsules cernuous. *Bot. Mag.* t. 6460.—Rhodoraceæ, *Griff. Itin. Notes,* 148, n. 717. Rhodora deflexa, *Griff. Itin. Notes,* 187, n. 969.

EAST NIPAL, SIKKIM and BHOTAN, alt. 8–11,000 ft., *Griffith, J. D. H.*, &c.

A small tree, sometimes 20 ft., or a bush. *Leaves* mostly in terminal clusters, 1$\frac{3}{4}$ by $\frac{3}{4}$–1 in., narrowed at both ends, acute or obtuse, pubescent beneath, at least when young; petiole $\frac{1}{6}$-$\frac{1}{3}$ in. *Peduncles* about 10, 1–2 in., 1- (rarely 2-)flowered, hairy. *Calyx-teeth* $\frac{1}{8}$-$\frac{1}{6}$ in., lanceolate, scarcely pubescent. *Corolla* $\frac{1}{3}$ by $\frac{1}{4}$ in., base not gibbous, red-orange. *Anther-cells* oblong, each awned. *Capsule* $\frac{1}{4}$ in. diam., globose, somewhat pentagonal, glabrous. *Seeds* large, $\frac{1}{8}$ in., ellipsoid, subtrigonous; testa very lax crisped and honeycombed.

7. DIPLARCHE, *H. f. & T.*

Small low shrubs. *Leaves* small, sessile, crowded, linear-oblong, coriaceous, serrate or long-ciliate, subacute or ending in a gland. *Flowers* small, rose-coloured, subcapitate, terminal; bract ciliate, ovate; bracteoles lateral, linear, shorter than the sepals. *Sepals* 5, coriaceous, ciliate. *Corolla* deciduous; tube cylindric; lobes 5, obovate, patent. *Stamens* 10, included; 5 inserted high on the corolla, alternate with its lobes; 5 alternate basal or hypogynous; anthers elliptic, dehiscing longitudinally. *Ovary* 5-celled; style short, stigma capitate 5-lobed; ovules numerous in each cell. *Capsule* globose, enclosed by the calyx, 5-celled, septicidally 5-valved; the wall of the cells splitting into two layers, the outer of which breaks up in appearance loculicidally. *Seeds* very many, obovate-cuneate, compressed; testa of lax tissue.—Species 2, Himalayan.

1. **D. multiflora,** *H. f. & T. in Hook. Kew Journ.* vi. (1854) 383, t. 11, fig. A; branches glandular-pubescent, flowers many densely capitate, sepals linear-oblong subacute, lower 5 stamens attached to the corolla.

SIKKIM HIMALAYA; Lachen, alt 11,000 ft., *J. D. H.*

Leaves $\frac{1}{4}$ by $\frac{1}{10}$ in. *Flowers* 8–20 forming a globose head $\frac{1}{2}$ in. diam. *Peduncle* in fruit elongate, pubescent; capsules $\frac{1}{8}$ in. diam., spicate.

2. **D. pauciflora,** *H. f. & T. in Hook. Kew Journ.* vi. (1854) 383, t. 11, fig. B; branches glabrous or nearly so, flowers terminal few, sepals ovate-oblong obtuse, lower 5 stamens free from the corolla.

SIKKIM HIMALAYA; Kankola, alt. 15,000, *J. D. H.*

Closely resembling *D. multiflora*, but smaller in all its parts. *Leaves* $\frac{1}{6}$–$\frac{1}{5}$ in. *Flowers* 2–6 at the apex of the branch. *Stamens* of the lower series often left surrounding the capsule after the corolla has fallen.

8. RHODODENDRON, *Linn.*

Trees or shrubs, sometimes very small; often scaly or aromatic. *Leaves* alternate, often clustered towards the ends of the branches, rarely subopposite or falsely whorled, entire, coriaceous. *Flowers* fascicled or subcorymbose, terminal, rarely solitary or axillary; bracts broad, generally caducous; bracteoles linear. *Calyx* 5-lobed, sometimes small or obsolete, rarely saucer-shaped, persistent. *Corolla* campanulate, widely funnel-shaped or cylindric, tube long or short, lobes 5–10. *Stamens* 5–18, usually 10; anthers oblong, dehiscing by terminal pores. *Ovary* 5–20-celled; style long or short, stigma capitate; ovules very many in each cell. *Capsule* short woody, or elongate thinner, 4–20-celled, septicidally 4–20-valved from the apex, valves breaking away from the placentas. *Seeds* very many, ellipsoid, albuminous; testa close or loose, often shortly crested, or tailed at one or both ends.—Species 130, in the Mts. of Europe, Asia, Malaya and N. America.

SUBGENUS I. **Vireya** (*Gen. Blume Bijd.* 854). *Capsule* elongate, acute; valves twisting after dehiscence, not woody; placentæ separating (leaving a slender central axis) as five filiform ribs, attached at the apex. *Seeds* very long-tailed at both ends, the tails many times longer than the seed.—Malayan large shrubs; leaves subopposite or almost whorled; flowers in sessile terminal umbels; bracts caducous; exocarp often separating from the endocarp, dehiscing irregularly or somewhat loculicidally.

* *Leaves sprinkled beneath with sessile round glandular scales.*

1. **R. malayanum,** *Jack in Mal. Misc.* ii. n. 7, 17; leaves lanceolate acute glabrous glandular-scaly beneath, corolla red, tube cylindric twice as long

as the round patent lobes. *Hook. Journ. Bot.* i. 369; *DC. Prodr.* vii. 725; *Bot. Mag.* t. 6045; *Becc. Malesia*, i. 205. R. tubiflorum *and* celebicum, *DC. Prodr.* vii. 725; *Miq. in Ann. Mus. Lugd. Bat.* i. 44, t. 2, A, B. R. lampongum, *Miq. Fl. Ind. Bat. Suppl.* 585. Vireya tubiflora *and* celebica, *Blume Bijd.* 855, 854.

MALACCA; Mt. Ophir, alt. 4000 ft., *Griffith*, &c.—DISTRIB. Sumatra, Java, Celebes.

A large shrub, all parts more or less glandular and scaly. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., base cuneate; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Umbels* terminal, 2–6-flowered; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in. *Calyx* very small. *Corolla-tube* $\frac{2}{3}$ by $\frac{1}{4}$ in. *Stamens* 10; filaments glabrous. *Ovary* 5-celled; stigma clavate not peltate. *Capsule* 1–$1\frac{1}{4}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., acute; valves recurved to the base, twisted.

2. **R. jasminiflorum,** *Hook. Bot. Mag.* t. 4524; leaves elliptic obtuse very coriaceous glabrous glandular-scaly beneath, corolla white tube cylindric thrice as long as the obovate patent lobes. *Lemaire Jard. Fleur.* t. 41; *Illustr. Hortic.* (1859) t. 203.

MALACCA; Mt. Ophir, *Griffith, Maingay*.—DISTRIB. Java.

A small shrub. *Leaves* $2\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., obtuse, base rounded or cordate; petiole $\frac{1}{6}$ in. *Umbels* 3–8-flowered; pedicels $\frac{1}{2}$ in., pubescent. *Calyx-lobes* hardly any. *Corolla-tube* $1\frac{1}{2}$ by $\frac{1}{8}$ in., sparsely glandular-scaly or glabrous without. *Stamens* 10; filaments minutely pilose. *Ovary* 5-celled, glandular scaly; style glandular, stigma subclavate. *Capsule* 1 by $\frac{1}{5}$ in., acute, glandular-scabrous; valves recurved to the base, twisted.

** *Leaves eglandular beneath.*

3. **R. javanicum,** *Benn. Pl. Jav. Rar.* 85, t. 19; leaves lanceolate narrowed at both ends glabrous eglandular, corymbs many-flowered, corolla large orange-red wide-funnel-shaped from a tubular base. *DC. Prodr.* vii. 721; *Bot. Mag.* t. 4336; *Fl. des Serres* (1847), t. 293; *Miq. in Ann. Mus. Lugd. Bat.* i. 42, t. 1, B. Vireya javanica, *Blume Bijd.* ii. 854.

MALAY PENINSULA; *Lobb*.—DISTRIB. Sumatra, Java, Celebes.

A large shrub. *Leaves* 6 by $1\frac{1}{2}$ in., primary nerves either oblique to or at right angles with the midrib, sometimes obscurely punctate beneath; petiole $\frac{1}{3}$ in. *Umbels* solitary; pedicels 3–12, 1–2 in., nearly glabrous; bracts $1\frac{1}{2}$ in., linear-oblong. *Calyx* obsolete. *Corolla* 2 in. long, and as much in diam., rose orange or brick-red, glabrous without; lobes 5, round. *Stamens* 10; filaments glabrous. *Ovary* glabrous or glandular-scaly; style usually glabrous; stigma large, peltate. *Capsule* 1 by $\frac{1}{5}$ in., acute.

4. **R. moulmainense,** *Hook. Bot. Mag.* t. 4904; leaves lanceolate acute at both ends glabrous eglandular, pedicels 3–4 clustered on short axillary spurs close below the terminal bud, corolla rose-red, lobes elliptic acute much longer than the cylindric tube. *Kurz in Journ. As. Soc.* 1877, ii. 216, and *For. Fl.* ii. 94.

MOULMEIN; Thoung-gyrai, alt. 5000 ft., *Lobb*; Nattoung Expedition, *Parish*.

A stout shrub. *Leaves* 4 by $1\frac{1}{2}$ in.; petiole $\frac{1}{5}$ in. *Umbels* 1–4 together, so that the inflorescence appears a 2–10-flowered lateral or pseudo-terminal umbel; pedicels 1 in., glabrous; bracts 1 in., elliptic, acute, glabrous; bracteoles $\frac{1}{2}$ in., linear, hairy. *Calyx-lobes* minute. *Corolla-tube* $\frac{1}{2}$ in., slightly wider upwards; lobes 5, $\frac{3}{4}$–1 by $\frac{1}{3}$ in., subacute, erect-patent. *Stamens* 10, glabrous. *Ovary* 5-celled, glabrous; stigma peltate. *Capsule* narrow, acute (not ripe).—Kurz failed to distinguish this from *R. javanicum*; but the inflorescence is so totally different that according to Maximowicz's views its affinity is with *R. Keysii*.

5. **R. Teysmanni,** *Miq. Fl. Ind. Bat. Suppl.* 585; leaves oblong-lanceolate acute eglandular often whorled, umbels terminal many-flowered, corolla

yellow tube cylindric below widely funnel-shaped upwards. *Miq. in Ann. Mus. Lugd. Bat.* i. 42, t. 1, A.

PENANG; *Maingay*, n. 1099.—DISTRIB. Sumatra.

A large shrub. *Leaves* 7 by 2½ in., shortly acute at both ends; petiole ⅓ in. *Pedicels* 2–7, 1 in., pubescent. *Calyx-lobes* obsolete. *Corolla* 1¾ in. long, and broad; lobes 5, large, round, erecto-patent. *Stamens* 10; filaments densely hairy downwards. *Ovary* 5-celled, densely hairy; style glabrous, stigma small, clavate. *Capsule* 1½ by ¼ in., acute, closely pubescent; exocarp separating half-way down; endocarp dehiscing loculicidally, about ⅓ its length twisting up.—Closely allied to *R. javanicum*, and perhaps not really separable by the colour of the corolla; but larger in all its parts and having a densely hairy ovary.

SUBGENUS II. **Pseudovireya.** Characters of *Vireya*, but valves of the capsule recurved, not twisting after dehiscence.

6. **R. vaccinioides,** *Hook. f. Rhod. Sikkim Himal.* pt. ii. p. 3; leaves scattered small obovate-oblong obtuse glabrous glandular-scaly beneath, flowers solitary, corolla white or pinkish tube short broadly cylindric lobes wide-spreading. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 81, 96.

SIKKIM HIMALAYA; alt. 6–8000 ft.; Lachen and Darjeeling, *J. D. H.*, *Gamble*, &c.

A shrub, 1–3 ft., sometimes epiphytic; branches scabrous. *Leaves* ⅔ by ¼ in.; base attenuate, scarcely petioled. *Pedicels* ⅓ in., glandular; bracts ⅙ in., closely sheathing their base even in fruit. *Calyx-lobes* $\frac{1}{16}$ in., ovate-oblong. *Corolla-tube* ⅛–⅙ in.; lobes 5, ⅙–¼ in., round or obovate, entire. *Stamens* 10, filaments densely hairy. *Ovary* 5-celled, scaly, not hairy; stigma clavate. *Capsule* 1 by ⅕ in., acute; valves recurved to their base.

SUBGENUS III. **Eurhododendron.** *Capsule* ovoid cylindric or oblong; valves woody; placentæ remaining attached to the central axis. *Seeds* without tails, or tail shorter than the seed.—*Inflorescence* terminal, or pedicels clustered, axillary or pseudo-terminal.

SERIES A. *Leaves* beneath glabrous or tomentose without glandular scales. *Corolla* widely funnel-shaped or campanulate.—Large shrubs or trees.

* Corymbs many-flowered. Calyx-lobes small or obsolete.

† *Corolla-lobes more than 5, stamens* 12–18.

7. **R. grande,** *Wight Ic.* t. 1202; leaves long-petioled oblong-lanceolate glabrous silvery beneath, corolla white. R. argenteum, *Hook. f. Rhod. Sikkim Himal.* t. 9 and *in Journ. Hort. Soc. Lond.* vii. 76, 91; *Fl. des Serres*, v. (1849) t. 473–476; *Bot. Mag.* 5054. Rhododendron, *Griff. Itin. Notes*, 139, n. 618. R. longifolium, *Nutt. in Hook. Kew Journ.* v. (1853) 365. R. Windsorii, var. γ, *Nutt. l. c.* 357, 358. Waldemaria argentea, *Klotzsch in Reis. Pr. Waldem. Bot.* 99, t. 53–4.

SIKKIM HIMALAYA; alt 7–11,000 ft., frequent, *J. D. H*, &c. BHOTAN; alt. 7000 ft.; *Griffith, Booth.*

A tree, 30 ft. *Leaves* 9 by 3 in., tapering at the base, primary nerves prominent and parallel; petiole ¾–1½ in. *Heads* many flowered, dense; outermost empty bracts glabrescent; flower-bracts 1 by ½–¾ in., densely hairy. *Calyx* very short, lobes obscure. *Corolla* 2–3 by 2–2½ in. (in Griffith's examples much smaller), 5–8-lobed, sometimes pinkish when young. *Stamens* 10–16; filaments pilose or glabrous. *Ovary* glandular, scarcely pubescent, 10–16-celled; stigma very large. *Capsule* 1¼ by ½ in., more or less tomentose, curved. *Seeds* ellipsoid, compressed, margined.

8. **R. Hodgsoni,** *Hook. f. Rhod. Sikkim. Himal.* t. 15; leaves long-petioled narrowly obovate-oblong cinnamoneous or whitish subtomentose beneath, corolla bright-rose or purplish. *Hook. f. in Journ. Hort. Soc. Lond.* vii.

76, 97; *Bot. Mag.* t. 5552; *Rev. Hortic.* 1855, 421, t. 22.—Rhododendron, *Griff. Notul.* iv. 303 and *Ic. Pl. Asiat.* t. 521.

EASTERN HIMALAYA; from Nipal to Bhotan, alt. 10–12,000, abundant, *Griffith, J. D. H.*, &c.

A broad, round shrub, 10–20 ft. *Leaves* 10 by 4 in., obtuse, cuneate or rounded at the base; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. *Heads* many-flowered, dense; bracts $1\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., silky; pedicels 1–2 in., hairy. *Calyx* subobsolete. *Corolla* $1\frac{1}{2}$ by 1 in., 6–10-lobed. *Stamens* 14–18; filaments glabrous or nearly so. *Ovary* glandular, scarcely pubescent, 10–12-celled. *Capsule* $1\frac{1}{2}$ by $\frac{1}{5}$ in., narrowly cylindric, curved, furfuraceous or subtomentose. *Seeds* narrowly oblong; testa hardly lax or produced except at the end.

9. **R. Falconeri,** *Hook. f. Rhod. Sikkim. Himal.* t. 10; leaves large long-petioled elliptic obtuse ferruginous-tomentose beneath, very coriaceous, corolla white or yellowish with purple spots at the base within. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 76, 97; *Fl. des Serres*, v. (1849) t. 477–80; xi. t. 1166–7; *Regel Gartenfl.* t. 658. R. eximium *and* venosum, *Nutt. in Hook. Kew Journ.* v. 364, 365.—Rhododendron, *Griff. Itin. Notes*, 140, n. 654.

From EAST NIPAL to BHOTAN; alt. 9–13,000 ft., abundant, *Griffith, J. D. H.*, &c.

A tree, 30 ft.; or frequently a large gregarious shrub. *Leaves* 9 by 3–4 in., base obtuse or subcordate, rugose by impressed nerves above; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. *Heads* many-flowered, dense; bracts large, densely hairy; pedicels 1–2 in., ferruginous-tomentose. *Calyx* subobsolete. *Corolla* 1–2 by $\frac{3}{4}$–$1\frac{1}{2}$ in., 7–10-lobed, usually white, sometimes yellow even when young. *Stamens* 12–16; filaments slightly hairy below. *Ovary* densely ferruginous-woolly, 10–16-celled; style glabrous; stigma very large. *Capsule* 1–2 by $\frac{1}{2}$–1 in., more or less tomentose and curved. *Seeds* ellipsoid, compressed margined.

†† *Corolla-lobes 5, entire or emarginate, stamens* 10.

(*a*) *Corolla purple, rose or white.*

10. **R. arboreum,** *Sm. Exot. Bot.* t. 6; leaves lanceolate or oblong narrowed at both ends rugose-veined on both surfaces silvery or with rusty tomentum beneath, corolla campanulate red pink or nearly white. *Hook. Exot. Fl.* t. 168; *Bot. Reg.* tt. 890, 1240, 1982; *Wall. Cat.* 755, and *Pl. As. Rar.* ii. 23, t. 123; *DC. Prodr.* vii. 720; *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 92; *Bot. Mag.* t. 5311; *Bedd. Fl. Sylv.* t. 228; *Brand For. Fl.* 281; *Kurz For. Fl.* ii. 93; *in Journ. As. Soc.* 1877, pt. ii. 216. R. puniceum, *Roxb. Hort. Beng.* 33, and *Fl. Ind.* ii. 409. R. cinnamomeum, *Wall. Cat.* 760; *G. Don Gen. Syst.* iii. 844. R. album, *Sweet Brit. Fl. Gard.* v. (1838) t. 148. R. Campbelliæ, *Hook. f. Rhod. Sikkim Himal.* t. 6. R. Windsorii, *Nutt. in Hook. Kew Journ.* v. 1853, 357, *var. β included* (*not var. γ*).—Boorans, *Hardwicke in Asiat. Research.* vi. 359.

TEMPERATE HIMALAYA; alt. 5–10,000 ft., from Kashmir to Bhotan, very common. KHASIA MTS.; alt. 4–6000 ft., common. BIRMA; Karen Hills, *Kurz.*

A tree, 25 ft. *Leaves* 5 by $1\frac{1}{4}$ in., acute, rarely shortly so, base cuneate, tomentum beneath usually hard white, sometimes cinnamoneous or more woolly; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Heads* many-flowered, dense; pedicels 0–$\frac{1}{4}$ in., hairy; bracts densely hairy. *Calyx-lobes* sometimes $\frac{1}{8}$ in., widely ovate, sometimes very obscure. *Corolla* 1–$1\frac{1}{2}$ by $\frac{3}{4}$–1 in., 5-lobed, usually red, sometimes pink nearly white as depicted by Wallich. *Stamens* 10; filaments glabrous or nearly so. *Ovary* mealy or ferruginous-woolly, usually 7–9-celled. *Capsule* 1 by $\frac{1}{3}$ in., cylindric, curved, furfuraceous. *Seeds* ellipsoid, testa scarcely lax except produced at the end.—In *R. Campbelliæ* the leaves are 9 by $2\frac{1}{2}$ in., with petiole $\frac{3}{4}$ in. In *R. Windsori*, in all the numerous examples collected by Booth, the calyx is, as Nuttall describes, minute; but, in the cultivated plant (*Bot. Mag.* t. 5008), they are ovate-lanceolate acuminate.

VAR. *nilagirica*; leaves elliptic or oblong subobtuse, the base rhomboid or often rounded. R. nilagirica, *Zenk. Pl. Ind.* t. 15. R. arboreum, var. *Wight Ill.* t. 140, and *Ic.* t. 1201. R. nobile, *Wall. Cat.* 1521, B.—Mts. of South India and Ceylon, alt. 5–8000 ft., very common. The whole of the Deccan material at Kew is very homogeneous, and unlike the Himalayan; Beddome's figure (*Fl. Sylv.* t. 228) from fresh Nilgherry specimens exhibits however nearly the Himalayan form.

11. **R. niveum,** *Hook. f. Rhod. Sikkim Himal., Conspect.* p. 4; leaves lanceolate narrowed at both ends mealy-tomentose beneath not rugose, corolla campanulate lilac. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 93; *Bot. Mag.* t. 4730; *Lemaire Jard. Fleur.* iv. t. 421. Rhododendron sp., *Griff. Itin. Notes,* 185, n. 947. R. Blumei, *Nutt. in Hook. Kew Journ.* v. (1853) 366?.

SIKKIM HIMALAYA; alt. 10–12,000 ft., frequent, *J. D. H., Clarke.*

Closely allied to *R. arboreum*, but distinct. The leaves do not exhibit the nerves impressed on the upper surface nor is the under surface so softly and opaquely tomentose; and lilac flowers are unknown in *R. arboreum*. The seeds of *R. niveum* are narrow, oblong with a very lax testa, much produced at both ends, and appearing as a margin on both sides, differing from the seeds of *R. arboreum*. The pedicels are longer, often ¾ in. The capsule, which has been supposed different from that of *R. arboreum*, is nearly the same, usually a little smaller.

12. **R. campanulatum,** *Don in Mem. Wern. Soc.* iii. 410; leaves elliptic subobtuse at both ends with a close cinnamoneous tomentum concealing the nervation beneath, corolla campanulate purple, ovary and capsule glabrous or nearly so. *Wall. Cat.* 756; *Don Prodr.* 153; *Lodd. Bot. Cab.* t. 1944; *Sweet Brit. Fl. Gard.* vi. (1838) t. 241; *DC. Prodr.* vii. 721; *Loud. Arb. Brit.* 589, t. 1114; *Bot. Mag.* t. 3759; *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 100; *Brand. For. Fl.* 281. R. æruginosum, *Hook. f. Rhod. Sikkim Himal.* t. 22. R. nobile, *Wall. Cat.* 1521, A, *chiefly*. R. Edgarii, *Gamble Darjeeling List.* 52.

ALPINE HIMALAYA; alt. 9–14,000 ft., from Kashmir to Bhotan, plentiful.

A large shrub, 6–16 ft. *Leaves* 5 by 2¼ in., often mucronate, glabrous, very closely minutely reticulated above; tomentum beneath sometimes more lax woolly, sometimes flocculose and deciduous; petiole ¾–1 in. *Pedicels* ¾–1¼ in., glabrous; bracts 1 in., broad-oblong, silky. *Calyx-teeth* scarcely $\frac{1}{12}$ in., broadly triangular. *Corolla* 1–1½ by ¾–1 in., 5-lobed. *Stamens* 10; filaments glabrous. *Ovary* 5–9-celled. *Capsule* ¾–1¼ by ¼–⅓ in. cylindric, more or less curved. *Seeds* linear-oblong, compressed; testa scarcely produced except at the end.

VAR. *Wallichii*, Hook. f.; leaves elliptic or oblong tomentum beneath lax often caducous, petiole densely woolly. R. Wallichii, *Rhod. Sikkim Himal.* t. 5. R. planifolium, *Nutt. in Hook. Kew Journ.* v. (1853) 365. R. Batemani, *Hook. Bot. Mag.* t. 5387.—Sikkim; alt. 10–12,000 ft., *J. D. H.*, &c. BHOTAN; *Booth. Leaves* sometimes 5 by 2 in.

13. **R. fulgens,** *Hook. f. Rhod. Sikkim Himal.* t. 25; leaves elliptic base rounded cinnamoneous tomentose beneath, heads dense, calyx-teeth subobsolete, corolla campanulate scarlet, ovary and capsule glabrous. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 100; *Fl. des Serres,* viii. (1852–3) t. 789. R. nobile, *Wall. Cat.* 1521, *in part.*

NIPAL; *Wallich.* SIKKIM; alt. 10–14,000 ft., *J. D. H.*, &c.

Similar to *R. campanulatum*, except as to the points mentioned in the diagnosis; the leaves are often subcordate at the base. In flower it is at once recognised by its unequalled brilliant colour.

14. **R. Kendrickii,** *Nutt. in Mag. Nat. Hist.* 2, xii. (1853) 10; leaves very narrowly lanceolate acuminate glabrous, heads dense many-flowered, calyx minutely lobed, corolla campanulate bright-red, ovary strigose. *Nutt. in Hook.*

Kew Journ. v. 1853, 358; *Bot. Mag.* t. 5129.—Rhododendron sp., *Griff. Itin. Notes,* 141, n. 656.

BHOTAN; Duphla Hills, alt. 7000 ft., *Griffith, Booth.*

A large shrub. *Leaves* 6½ by 1–1¼ in.; base cuneate or obtuse; petiole ½ in. *Heads* closely packed; rachis brown-villous; pedicels ¼ in., nearly glabrous; bracts ¾ in., broadly oblong, villous. *Corolla* 1½ in., 5-lobed. *Stamens* 10. *Capsule* 1 by ⅛ in., curved, nearly glabrous. *Seeds* oblong, compressed; testa somewhat lax, produced at both ends.—This seems allied to *R. arboreum* as Nuttall suggests, differing by the very narrow capsule. The leaves are described above from the Bhotan examples; in Bot. Mag. t. 5129, taken from a plant grown in England, and called var. *latifolia,* the leaves are not narrower than in the North Indian *R. arboreum.*

15. **R. Shepherdii,** *Nutt. in Hook. Kew Journ.* v. (1853) 360; leaves linear-oblong acute glabrous, heads dense many-flowered, calyx small 5-lobed, corolla campanulate bright-red, ovary glabrous. *Bot. Mag.* t. 5125.

BHOTAN; Oola Mts., *Booth.*

Nothing is known of this at Kew except the drawing of Mr. Holden, communicated and figured in *Bot. Mag.* t. 5125. It differs from *R. Kendrickii,* var. *latifolia,* in the glabrous ovary, the more developed more distinctly lobed calyx. On the faith of the larger calyx it has been (by Hook. f. in Gen. Pl. ii. 600) removed to the next section and placed next *R. Thomsoni.*

(*b*) *Corolla yellow.*

16. **R. Wightii,** *Hook. f. Rhod. Sikkim Himal.* t. 27; leaves narrowly obovate-oblong rhomboid at the base closely cinnamoneous tomentose beneath, heads many-flowered somewhat lax, corolla campanulate yellow, ovary ferruginous woolly. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 99.; *Fl. des Serres,* viii. (1852–3) t. 792–3.

EAST NIPAL and SIKKIM; alt. 11–14,000 ft., *J. D. H.*, &c.

A shrub, 6–14 ft. *Leaves* 7 by 2½ in., mucronate, hardly acute, above glabrous, minutely closely reticulate, beneath adpressed-tomentose; petiole ⅓ in., more or less tomentose, not hirsute. *Pedicels* 10–20, ½–1½ in., hairy, sometimes glandular or ferruginous; bracts 1½ in., spathulate-oblong, silky. *Calyx-lobes* subobsolete. *Corolla* 1½ by 1 in., 5-lobed. *Stamens* 10; filaments scaly-woolly at the base. *Ovary* 10-celled. *Capsule* 1¾ by ⅓ in., cylindric, curved, ultimately glabrescent. *Seeds* linear-oblong, large for *Rhododendron,* compressed; testa close, produced at one end.

17. **R. lanatum,** *Hook. f. Rhod. Sikkim Himal.* t. 16; leaves narrowly obovate-elliptic cuneate at the base cinnamoneous and woolly beneath, heads few-flowered lax, corolla campanulate yellow, fruit ferruginous-lanate. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 79, 100; *Fl. des Serres,* vii. (1851–2) t. 684; *Rev. Hortic.* 1855, t. 9.

SIKKIM HIMALAYA; Jongri, alt. 12–13,000 ft., *J. D. H.*, &c.

Branchlets upwards densely woolly. *Leaves* 4 by 1¾ in., subobtuse, more or less lanate or ultimately glabrescent above except the midrib; petiole densely woolly, not hirsute. *Flowers* 5–7 in a head, nodding. *Capsule* ½–¾ by ⅕–¼ in. *Seeds* smaller than those of *R. Wightii,* which this species resembles except in the points mentioned.

18. **R. campylocarpum,** *Hook. f. Rhod. Sikkim Himal.* t. 30; leaves elliptic obtuse at the base glabrous on both surfaces, heads somewhat lax, corolla campanulate yellow, ovary sparsely covered with stalked glands. *Hook. f. in Journ Hort. Soc. Lond.* vii. 79, 101; *Bot. Mag.* t. 4968.

EAST NIPAL and SIKKIM; alt. 11–14,000 ft., *J. D. H.*, &c.

A shrub, 4–8 ft. *Leaves* 2½–3 by 1½ in., obtuse, base rounded sometimes subcordate, rarely rhomboid, minutely reticulated on both surfaces; petiole ½–¾ in., with

scattered stalked glands or glabrescent. *Flowers* few or many in the head; pedicels 1–1½ in., very glandular upwards; bracts 1 in., spathulate-oblong, hairy. *Corolla* 1½ by 1 in. *Stamens* 10; filaments glabrous. *Ovary* 5-celled. *Capsule* ¾ by ⅕ in., subcylindric, much curved, with scattered stalked glands or ultimately nearly glabrous and shining. *Seeds* oblong, compressed; testa close, produced at one end.

** *Calyx deeply-lobed or dilated.*

† *Branchlets not woolly.*

19. **R. Griffithianum,** *Wight Ic.* t. 1203; leaves oblong subacute glabrous, calyx widely saucershaped margin subentire, corolla white. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 76, 93; *Bot. Mag.* t. 5065. R. Aucklandii, *Hook. f. Rhod. Sikkim Himal.* t. 11; *Rev. Hortic.* 1855, t. 5; *Regel Gartenfl.* (1866) t. 517. R. oblongum, *Griff. Ic. Pl. Asiat.* t. 523.—Rhododendron sp., *Griff. Itin. Notes,* 192, n. 1045.

SIKKIM and BHOTAN, alt. 7–9000 ft., *Griffith, J. D. H.,* &c.

A tree, 40 ft.; also (as most of the other Rhododendron trees) not rarely flowering as a shrub 4–8 ft. *Leaves* 7 by 2 in., exactly oblong with subparallel sides, rounded or cuneate at the base; petiole 1 in. *Pedicels* 2–5, 1–2 in., with large flowers, or numerous subpanicled with smaller flowers; bracts 1½ in., linear-oblong villose. *Calyx* in flower ⅓ in. diam., patent; in fruit often enlarged, unequal, or torn. *Corolla* 1½–2¾ in., widely funnel shaped, often spotted pink. *Stamens* 12–18; filaments glabrous or nearly so. *Ovary* 12-celled, glandular-pubescent. *Capsule* 1¼ by ⅔ in., short-cylindric, very woody, at length glabrous. *Seeds* ellipsoid, compressed; testa lax, appearing as a margin completely (or nearly) surrounding the seed.

20. **R. Thomsoni,** *Hook. f. Rhod. Sikkim Himal.* t. 12; leaves broadly elliptic obtuse at both ends, calyx cup-shaped obscurely unequally lobed, corolla deep crimson. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 77, 99; *Bot. Mag.* t. 4997; *Fl. des Serres,* viii. (1851–2) t. 688–90; *Morr. Belg. Hortic.* viii. 33, t. 10; *Rev. Hortic.* 1855, t. 7.

EAST NIPAL and SIKKIM; alt. 11–13,000 ft., common, *J. D. H.,* &c.

A large shrub, 6–15 ft. *Leaves* 3 by 1¾ in., often cordate at the base, glaucous beneath, finely reticulated; petiole ½–¾ in. *Pedicels* ¼–1 in., glabrous or nearly so; bracts 1–1½ in., spathulate oblong, hairy. *Calyx* in flower ⅙ in., in fruit enlarged, often very unequal on one side, more or less lobed or lacerate, glaucous, glabrous. *Corolla* 1–1¾ in., wide-funnelshaped. *Stamens* 10. *Ovary* glabrous, 6–10-celled. *Capsule* ¾ by ⅓ in., glaucous purple. *Seeds* linear-oblong compressed; testa produced at each end, otherwise scarcely lax.

VAR. *Candelabrum,* Hook. f.; calyx shorter and with the ovary sparingly stalked-glandular. R. Candelabra, *Hook. f. Rhod. Sikkim Himal.* t. 29.—Sikkim, *J. D. H.*

VAR. *flocculosa*; leaves beneath cinnamoneous flocculose or furfuraceous.—Sikkim, *Clarke.*

21. **R. Hookeri,** *Nutt. in Hook. Kew Journ.* v. (1853); leaves oblong obtuse at both ends squamulose on the nerves beneath, calyx cupshaped obscurely unequally lobed glabrous. *Hook. Bot. Mag.* t. 4926.

BHOTAN; Oola Mts., alt. 7–8000 ft., *Booth.*

Leaves 4–5 by 1½–2 in.; petiole 1 in., otherwise as *R. Thomsoni,* of which it may be a var. The leaves are not so furfuraceous beneath as in *R. Thomsoni,* var. *flocculosa,* but they are much longer than in any of the numerous examples of *R. Thomsoni* itself.

22. **R. barbatum,** *Wall. Cat.* 757; leaves oblong acute glabrous the midrib beneath and petiole often coarsely bristly, heads many-flowered dense, calyx-lobes large elliptic, corolla campanulate deep red. *G. Don Gen. Syst.* iii. 844; *DC. Prodr.* vii. 721; *Hook. f. Rhod. Sikkim Himal.* t. 3 and *in Journ. Hort. Soc. Lond.* vii. 77, 91; *Fl. des Serres,* v. (1849) t. 469–72; *Morr. Belg. Hortic.*

ix. 186, t. 17. R. nobile, *Wall. Cat.* 1521, *partly.* R. lancifolium, *Hook. f. Rhod. Sikkim Himal.* t. 4.

TEMPERATE HIMALAYA; alt. 8–12,000 ft.; from KUMAON to BHOTAN; common in Sikkim.

A tree, 30–40 ft. *Leaves* 6 by $1\frac{1}{2}$–2 in., base rounded, reticulated beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., with bristles $\frac{1}{6}$–$\frac{1}{4}$ in. long, or (on the same branch) smooth. *Pedicels* $\frac{1}{4}$–$\frac{1}{2}$ in., glabrous; bracts $\frac{3}{4}$ in., oblong, hairy. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{6}$ in., glabrous. *Corolla* 1–$1\frac{1}{2}$ in. wide funnelshaped. *Stamens* 10. *Ovary* 5–9-celled, hairy. *Capsule* $\frac{2}{3}$ by $\frac{1}{4}$ in., hirsute. *Seeds* oblong, compressed; testa lax, produced at both ends, and often appearing as a margin round the seed.—The type form of this plant from Nipal and West Sikkim has the leaves generally glabrous; they are sometimes setose beneath and closely ciliate on the margin.

VAR. *Smithii*; leaves furfuraceous subtomentose beneath. R. Smithii, *Nutt. ms.*; *Bot. Mag.* t. 5120. Rhododendron sp., *Griff. Itin. Notes,* 145, n. 693 and 159, n. 813 a.—East Sikkim and Bhotan, alt. 8–12,000 ft., frequent.

†† *Branchlets densely woolly.*

23. **R. Edgeworthii,** *Hook. f. Rhod. Sikkim Himal.* t. 21; leaves elliptic subacute strongly rugose-veined above, corolla very large broadly funnel-shaped. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 77, 94; *Bot. Mag.* t. 4936; *Regel. Gartenfl.* v. t. 170; *Fl. des Serres,* viii. (1852–3) t. 797–8.—Ericinea, *Griff. Itin. Notes,* 155, n. 770.

SIKKIM HIMALAYA; alt. 7–9000 ft., *J. D. H.*, &c. BHOTAN; *Griffith, Booth.*

A shrub, 4–6 ft, terrestrial and erect or epiphytic. *Leaves* 4 by $1\frac{3}{4}$ in., base rhomboid, densely ferruginous, woolly beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Pedicels* $\frac{1}{4}$–1 in., densely woolly. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{5}$ in., obtuse, unequal. *Corolla* 2–3 in., 5-lobed about half-way down. *Ovary* and style below woolly. *Capsule* $\frac{3}{4}$ by $\frac{1}{3}$ in., densely ferruginous-woolly. *Seeds* linear; testa shortly tailed at each end.—There are round glandular scales beneath the wool of the leaves; the species might be arranged in Series B.

24. **R. pendulum,** *Hook. f. Rhod. Sikkim Himal.* t. 13; leaves elliptic-oblong glabrous or thinly floccose above, corolla small shortly broadly funnel-shaped. *Hook. f. in Hortic. Soc. Lond.* vii. 80, 103; *Fl. des Serres,* vii. (1851–2) t. 662.

SIKKIM HIMALAYA; alt. 9–11,000 ft.; Lachen, *J. D. H.*; Jongri and Dikchoo, *Clarke.*

Epiphytic; branches pendulous, 2–4 ft. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., obtusely rhomboid at both ends, rusty-woolly beneath; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Pedicels* $\frac{1}{4}$ in., rusty-woolly. *Calyx-lobes* $\frac{1}{5}$ by $\frac{1}{4}$ in., obtuse, rose-coloured. *Corolla* $\frac{2}{3}$ in., 5-lobed about half-way down, glandular without. *Capsule* $\frac{1}{2}$ by $\frac{1}{3}$ in., hirsute. *Seeds* linear-oblong; testa shortly tailed at each end.

SERIES B. *Leaves* sprinkled beneath with sessile round glandular scales (which in *R. Anthopogon* coalesce, forming apparently a tomentum). Large or small shrubs.

* *Calyx prominently lobed, lobes longer than broad.*

25. **R. Dalhousiæ,** *Hook. f. Rhod. Sikkim Himal.* tt. 1, 2; leaves obovate-oblong cuneate at the base glabrous, pedicels 2–5 clustered, calyx-lobes elliptic obtuse, corolla very large campanulate white. *Hook. in Journ. Hortic. Soc. Lond.* vii. 77, 93; *Bot. Mag.* t. 4718; *Fl. des Serres,* v. (1849) t. 460–8. R. macrocarpos, *Griff. Itin. Notes,* 138.

SIKKIM HIMALAYA; alt. 6–9000 ft., frequent, *J. D. H.*, &c. BHOTAN; alt. 6800 ft., *Griffith, Booth.*

A laxly branched shrub, often epiphytic. *Leaves* 4–5 by $1\frac{1}{2}$–2 in., obtuse or sub-

acute, sometimes ciliate; petiole $\frac{1}{6}$–$\frac{1}{3}$ in., sometimes pilose. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in., pubescent or pilose; bracts 2 in., oblong, hairy. *Calyx-lobes* $\frac{1}{3}$ by $\frac{1}{6}$ in., glabrous, usually pilose at the base, frequently ciliate on the margin. *Corolla* $2\frac{1}{2}$–4 in., often tinged yellow, green or pink, fragrant; lobes 5, subentire. *Stamens* 10. *Ovary* 5-celled, scaly-glandular. *Capsule* $1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., straight, glabrescent. *Seeds* linear-oblong, compressed, margined and shortly tailed; testa close.

26. **R. Nuttallii,** *Booth*; *Nutt. in Hook. Kew Journ.* v. (1853) 355; leaves elliptic base rounded glabrous, pedicels 2–5 clustered calyx-lobes oblong-oval obtuse, corolla very large white. *Hook. Bot. Mag.* t. 5146; *Fl. des Serres,* xiii. (1858) t. 1326; *Illustr. Hortic.* (1859) t. 208.

BHOTAN; Duphla Hills, alt. 4–5000 ft., *Booth.*

A tree, 30 feet; or a straggling epiphyte. *Leaves* 8 by 4 in., obtuse, coriaceous, rugose by impressed nerves above; petiole $\frac{3}{4}$ in. *Pedicels* 1–2 in., exceedingly thick in fruit. *Calyx-lobes* $\frac{3}{4}$ by $\frac{1}{2}$ in., glabrous or slightly ciliated, rose-coloured. *Corolla* 4–5 in., campanulate, tinged yellow at the base, pink at the mouth, fragrant; lobes 5, subentire. *Stamens* 10; filaments hairy below. *Ovary* 5-celled, sealy-glandular. *Capsule* $1\frac{3}{4}$ by $\frac{3}{4}$ in., straight. glabrescent. *Seeds* oblong, compressed. widely margined; testa close.—Nuttall says that the calyx, capsule and seeds in this species are wholly different from those of *R. Dalhousiæ*; but there appears little difference except in size.

27. **R. Boothii,** *Nutt. in Hook. Kew Journ. Bot.* v. (1853) 356; leaves rhomboid-elliptic acuminate ciliate and villose on the margin, corymbs dense many-flowered, calyx-lobes elliptic obtuse. corolla campanulate yellow. *Illustr. Hortic.* (1858) t. 174.

BHOTAN; Gascherong Hills, *Booth.*

A straggling epiphyte, 5–6 ft. *Leaves* 4–5 by $2\frac{1}{4}$ in., shortly acuminate, base rhomboid, young sprinkled with long lax ferruginous hairs, adult glabrous except the margins; petiole $\frac{1}{4}$ in., woolly. *Pedicels* $\frac{3}{4}$ in., slightly hairy. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{5}$ in., glabrous veined in fruit. *Corolla* $1\frac{1}{4}$ in., 5-lobed; stamens 10, with hairy filaments (*fide Illustr. Hortic.*). *Capsule* $\frac{2}{3}$ by $\frac{1}{2}$ in., rugose, furfuraceous. *Seeds* linear, compressed, tailed at both ends; testa close.

28. **R. ciliatum,** *Hook. f. Rhod. Sikkim Himal.* t. 24; branchlets leaves and pedicels with scattered bristles, leaves elliptic acute, pedicels 2–6-nate, calyx-lobes elliptic obtuse, corolla broadly funnel-shaped white or pale-rosy. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 77, 95; *Hook. Bot. Mag.* t. 4648; *Lindl. & Paxt. Fl. Gard.* t. 83; *Lemaire Jard. Fleur.* iii. t. 312; *Fl. des Serres,* viii. (1852–3) t. 766; *Regel Gartenfl.* t. 563.

SIKKIM HIMALAYA; Lachen, alt. 9000 ft., *J. D. H.*; Chola and Dikchoo, alt. 9–10,000 ft., *Clarke.*

A shrub, 2–4 ft., often spread over rocks. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., base obtuse or rounded, glabrous beneath or midrib bristly; petiole $\frac{1}{4}$ in. *Pedicels* $\frac{1}{4}$–$\frac{1}{2}$ in.; bracts ovate, glabrous. *Calyx-lobes* $\frac{1}{4}$ by $\frac{1}{5}$ in., glabrous, ciliate. *Corolla* $1\frac{1}{2}$ in.; lobes 5, emarginate. *Stamens* 10. *Ovary* 5-celled, scaly-glandular. *Capsule* $\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., scaly. *Seeds* linear; testa close, crested at one end.—The wild plant has the flowers white, slightly tinged with rose, fading a deeper rose. Sir J. D. Hooker sketched his species in Sikkim (*Rhod. Sikkim,* t. 24) from a plant "past flower;" hence with too purple a corolla.

29. **R. camelliæflorum,** *Hook. f. Rhod. Sikkim Himal.* t. 28; leaves oblong or elliptic glabrous densely ferruginous scaly beneath, pedicels 1–4-nate, calyx-lobes elliptic obtuse, corolla white tube cylindric lobes widely spreading. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 80, 103; *Hook. Bot. Mag.* t. 4932; *Regel. Gartenfl.* (1865) t. 460, fig. 1–3. R. sparsiflorum, *Nutt. in Hook. Kew Journ.* v. (1853) 363.

EASTERN HIMALAYA; from E. Nipal to Bhotan, alt. 9–13,000 ft., *J. D. H.*, &c.

A shrub, 2–6 ft. *Leaves* 3½ by 1¼ in., or 2½ by 1½ in., obtuse or acute, base obtuse or rhomboid; petiole $\frac{1}{8}$–¼ in. *Pedicels* ¼ in., scaly, rugose. *Calyx-lobes* $\frac{1}{5}$ by $\frac{1}{6}$ in., glabrous or nearly so. *Corolla-tube* ⅓ by ¼–⅓ in., lobes ⅓–½ in. diam., orbicular, entire. *Stamens* 12–16. *Ovary* 10-celled. *Capsule* ½ by ⅓ in., ellipsoid or sometimes ovoid, rough with scales. *Seeds* linear-lanceolate, produced acutely at both ends; testa close.

30. **R. leptocarpum,** *Nutt. ms.*; leaves elliptic-oblong base narrowed glabrous, corymbs many-flowered, calyx-lobes broadly elliptic obtuse, capsule narrow curved. R. pumilum, *Nutt. in Hook. Kew Journ.* v. (1853) 354, *not of Hook. f.*

BHOTAN; Oola Mts., alt. 7–8000 ft., *Booth.*

A slender, alpine, branching shrub, 1½–2 ft. *Leaves* 3 by 1–1¼ in., subobtuse, mucronate, finely reticulated above; petiole $\frac{1}{6}$ in., rusty-scaly. *Corymbs* 7–10-flowered; pedicels (in fruit) 1–1¾ in., slender, glabrous, scaly. *Calyx-lobes* (in fruit) $\frac{1}{5}$ in. long and broad, glabrous. *Corolla* not seen. *Capsule* ⅔ by $\frac{1}{5}$ in., rough with scales. *Seeds* linear-lanceolate; testa close, produced acutely at both ends.—The calyx and leaves are exceedingly like those of *R. camelliæflorum*, but the scales beneath are not so close, and the narrow capsule is very different.

31. **R. glaucum,** *Hook. f. Rhod. Sikkim Himal.* t. 17; leaves oblong glabrous glaucous beneath scaly above, corymbs 4–10-flowered, calyx-lobes ovate subacute scaly, corolla campanulate dull rose. *Hook. f. in Journ. Hort. Soc. Lond.* vii. 78, 102; *Hook. Bot. Mag.* t. 4721; *Fl. des Serres* (1851–2) t. 672; *Rev. Hortic.* (1855) t. 11.—Rhododendron sp., *Griff. Itin Notes,* 144, n. 691.

SIKKIM and BHOTAN; alt. 10–12,000 ft., *Griffith, J. D. H.*, &c.

A small shrub, 2 ft. *Leaves* 3 by 1¼ in. (those on barren shoots often much larger), subobtuse, mucronate, base rhomboid, lower surface with scattered glandular scales; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. *Pedicels* ½–1 in., scaly; bracts ½ in., ovate, scaly, caducous. *Calyx-lobes* ¼–⅓ by $\frac{1}{5}$ in. *Corolla* ½–⅔ in.; lobes 5, emarginate. *Stamens* 10, filaments woolly below. *Ovary* 5-celled, scaly. *Capsule* ⅓ by ¼ in., shortly ellipsoid. *Seeds* minute, lanceolate; testa closely, shortly produced at one end.

32. **R. pumilum,** *Hook. f. Rhod. Sikkim Himal.* t. 14, *not of Nutt.*; leaves small elliptic obtuse glabrous, pedicels 1–3 together long, calyx-lobes ovate-oblong obtuse, corolla widely funnel-shaped tube longer than the lobes rose-coloured hairy without. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 78, 102; *Fl. des Serres,* vii. (1851–2) t. 667.

SIKKIM HIMALAYA; Lachen, alt. 12–14,000 ft., *J. D. H.*

A shrub, 3–8 in. *Leaves* ½ by ⅓ in., often mucronate, rhomboid at the base, above glabrous and naked, beneath with scattered scales; petiole hardly any. *Pedicels* 1–2½ in., glandular, erect. *Calyx-lobes* $\frac{1}{10}$–$\frac{1}{8}$ in., in fruit $\frac{1}{5}$ in., sometimes glandular-scaly. *Corolla* ⅔ in., shortly 5-lobed. *Stamens* 10; filaments hairy below. *Ovary* 5-celled, scaly. *Capsule* ¼ by $\frac{1}{5}$–$\frac{1}{6}$ in., ovate-oblong, erect on the erect pedicel.

33. **R. lepidotum,** *Wall. Cat.* 758; leaves from obovate to lanceolate glabrous not setose, pedicels 1–3 together long, calyx-lobes elliptic obtuse, corolla yellow or dull purple tube short globose, lobes round wide spreading. *Royle Ill.* 260, t. 64, fig. 1; *DC. Prodr.* vii. 724; *Bot. Mag.* tt. 4657, 4802, 6450; *Lemaire Jard. Fleur.* iv. 343; *Hook. in Journ. Hort. Soc. Lond.* vii. 81, 104; *Brand. For. Fl.* 282. R. salignum *and* elæagnoides, *Hook. f. Rhod. Sikkim Himal.* t. 23, A, B. R. obovatum, *Hook. f. Rhod. Sikkim Himal. Conspect.* p. 6.

TEMPERATE and ALPINE HIMALAYA; alt. 8–15,000 ft.; from Kashmir to Bhotan, common.

A shrub, more or less scaly-glandular throughout, 1–6 ft.; branchlets very scabrid glandular. *Leaves* $\frac{1}{4}$–$1\frac{1}{2}$ in., obovate and obtuse or lanceolate and subacute, base narrowed; petiole scarcely any. *Pedicels* $\frac{1}{2}$–$1\frac{1}{2}$ in., very scabrous. *Calyx-lobes* $\frac{1}{10}$ in. *Corolla-tube* $\frac{1}{6}$ in.; lobes $\frac{1}{4}$ in. *Stamens* 8, very rarely 10; filaments hairy below. *Ovary* 5-celled. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., erect. *Seeds* oblong, acute; testa close, hardly produced at the ends.

34. **R. setosum,** *D. Don in Trans. Wern. Soc.* iii. 408, *Prodr.* 152; branchlets bristly, leaves elliptic-obovate obtuse scaly on both surfaces and often bristly beneath, pedicels 3–8 clustered short, calyx lobes elliptic, corolla red tube very short, lobes oblong spreading. *DC. Prodr.* vii. 724; *Hook. f. Rhod. Sikkim Himal.* t. 20, *and in Journ. Hortic. Soc. Lond.* vii. 81, 105. R. Anthopogon, *Wall. Cat.* 759, *partly.*

NIPAL; *Wallich.* SIKKIM; alt. 13–16,000 ft., *J. D. H.*, &c.

A small shrub, 1 foot. *Leaves* $\frac{1}{2}$ by $\frac{1}{4}$ in.; petiole very short, usually bristly. *Pedicels* $\frac{1}{4}$ in., glandular-scaly. *Calyx-lobes* $\frac{1}{6}$–$\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., obtuse, glandular-scaly. *Corolla-tube* $\frac{1}{5}$ in.; lobes $\frac{1}{2}$ by $\frac{1}{4}$ in. *Stamens* 8, sometimes 10; filaments hairy below. *Ovary* 5-celled, glandular-scaly. *Capsule* $\frac{1}{4}$ by $\frac{1}{5}$ in., ovoid, hardly larger than the calyx-lobes. *Seeds* ellipsoid, subacute at the ends; testa close, not produced.

35. **R. nivale,** *Hook. f. Rhod. Sikkim Himal.* t. 26; prostrate, leaves small elliptic, flowers solitary subsessile, corolla rose-red, tube short, lobes obovate-elliptic spreading. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 81, 105.

SIKKIM; alt. 13–16,000 ft., Phullong and Kinchinjhow, *J. D. H.*

A dense, small bush; hardly rising 2 in. from the ground. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., obtuse, glabrous, scaly on both surfaces. *Calyx-lobes* $\frac{1}{12}$ in., elliptic, obtuse, unequal. *Corolla-tube* $\frac{1}{8}$ in.; lobes $\frac{1}{4}$ in., round-obovate; hairy in the throat. *Stamens* 8 or 10; filaments hairy below. *Ovary* 5-celled, scaly. *Capsule* $\frac{1}{6}$ in. long, ovoid. *Seeds* ellipsoid, compressed, subacute; testa close, not produced.

36. **R. Anthopogon,** *D. Don in Mem. Wern. Soc.* iii. 409, and *Prodr.* 153; leaves petioled elliptic subobtuse at both ends glabrous above densely scaly beneath, pedicels short numerous fascicled terminal, corolla yellow, tube cylindric, lobes wide-spreading, *Wall. Cat.* 759, chiefly; *Royle Ill.* 260, t. 64, fig. 2; *Loud. Arb. Brit.* 590, t. 1115; *DC. Prodr.* vii. 725; *Hook. f. Rhod. Sikkim Himal. Conspect.* 7, and *in Journ. Hort. Soc. Lond.* vii. 82; *Hook. Bot. Mag.* t. 3947; *Brandis For. Fl.* 282. R. aromaticum, *Wall. Cat.* 1520 (*fide Hook. f., wanting in Herb. Wall.* R. palustre, *Turcz.; DC. Prodr.* vii. 715. R. parvifolium, *Adams in Mem. Soc. Mosc.* ix, 237. R. parviflorum, *F. Schmidt Reis. in Amurl.* 158 (*fide Maxim.*). R. fragrans *and* micranthum, *Maxim. Rhod. As. Orient.* 16, 18, t. 4, fig. 1–10. Azalea fragrans, *Adams*; *Roem. et Sch. Syst.* iv. 379. A. lapponica, *Pall. Fl. Ross.* ii. 52, t. 70, fig. 1, A, B. Osmothamnus fragrans *and* pallidus, *DC. Prodr.* vii. 715.

ALPINE HIMALAYA; alt. 11–16,000 ft., from Kashmir to Bhotan, common.—DISTRIB. Central and Northern Asia.

A small shrub, 1 ft.; branchlets scabrous and densely scaly. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., cinnamoneous beneath and as it were tomentose from the layer of glands; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. *Pedicels* 4–12, $\frac{1}{8}$–$\frac{1}{4}$ in., glabrous; bracts $\frac{1}{4}$ in., ovate, hairy. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{5}$ in., elliptic, obtuse, margin villous. *Corolla-tube* $\frac{1}{5}$ in., throat hairy; lobes $\frac{1}{4}$ in., elliptic-obovate, obtuse, entire. *Stamens* 6–8, included. *Ovary* 5-4-celled, scaly; style $\frac{1}{12}$–$\frac{1}{6}$ in.; 4–5 stigmatic points rising above the widened truncate summit of the style. *Capsule* $\frac{1}{5}$ in., ovoid. *Seeds* oblong, subacute; testa lax, not produced even at the ends.

** *Calyx very shortly, or obsoletely lobed.*

37. **R. Maddeni,** *Hook. f. Rhod. Sikkim Himal.* t. 18; leaves oblong or elliptic acute glabrous densely scaly beneath, corymbs 4–12-flowered, calyx-

teeth oblong, corolla very large white, mouth widely funnel-shaped. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 79, 95; *Hook. Bot. Mag.* t. 4805; *Fl. des Serres* (1853–4), t. 912; *Rev. Hortic.* (1855) t. 16; *Illustr. Hortic.* (1857) t. 140. R. Jenkinsii, *Nutt. in Hook. Kew Journ.* v. (1853) 361; *Regel Gartenfl.* ix. 277.

SIKKIM and BHOTAN; alt. 6000 ft., *J. D. H., Booth.*

A shrub, 6–8 ft. *Leaves* 5–6 by $1\frac{1}{4}$–$2\frac{1}{4}$ in., base rhomboid or rounded; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Pedicels* $\frac{1}{2}$–$\frac{3}{4}$ in., scaly. *Calyx-lobes* $\frac{1}{5}$ in., in fruit nearly $\frac{1}{3}$ in., triangular-oblong, glabrous, membranous. *Corolla* 3–4 in.; lobes 5, rounded. *Stamens* 18; filaments glabrous. *Ovary* 10-celled, scaly. *Capsule* 1 by $\frac{1}{2}$ in., ellipsoid. *Seeds* linear-lanceolate, caudate, large for the genus; testa close, produced at the ends.

VAR. *calophylla*; calyx-lobes shorter sometimes ovate obtuse, capsule much smaller. R. calophylla, *Nutt. in Hook. Kew Journ.* v. 362; *Bot. Mag.* t. 5002; *Fl. des Serres*, t. 2340; *Regel Gartenfl.* t. 460, fig. 4, 5; t. 577. R. macranthum, *Griff. Ic. Pl. Asiat.* t. 520, not R. macranthum, *Griff. Itin. Notes*, 144, n. 690. Rhododendron sp., *Griff. Itin. Notes*, 198, n. 1134.—Bhotan, alt. 4000 ft., *Griffith, Booth.*—The capsules in Griffith's and Booth's (numerous) examples hardly average one half the size of those of *R. Maddeni*; the largest capsule in *R. calophylla* is hardly $\frac{3}{4}$ by $\frac{1}{3}$ in., and its calyx-lobes are not at all enlarged in fruit. The leaves in the two varieties (or species?) are exactly alike.

38. **R. formosum,** *Wall. Pl. As. Rar.* iii. 3, t. 207; leaves obovate-lanceolate acute glabrous or setose-ciliate, corymbs 2–5-flowered, calyx-teeth small, corolla large white widely funnel-shaped. *DC. Prodr.* vii. 721; *Bot. Mag.* t. 4457; *Kurz in Journ. As. Soc.* 1877, pt. ii. 216, and *For. Fl.* ii. 94. R. Gibsonii, *Paxt. Mag. Bot.* viii. t. 217; *Fl. des Serres*, i. t. 18.

BHOTAN; *Griffith, Booth.* KHASIA MTS.; alt. 3–5000 ft., common. MARTABAN; Nattoung, alt. 7200 ft., *Kurz.*

A shrub, 8 ft.; branchlets glabrous, rarely ferruginous-bristly. *Leaves* 1–$2\frac{1}{2}$ in., variable in size, usually broadest above the middle, shortly acute, long attenuate to the base, glands beneath numerous (but not approximate as in *R. Maddeni*); petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Pedicels* $\frac{1}{4}$ in., glandular-scaly; bracts $\frac{1}{2}$ in., ovate, glabrous, ciliate. *Calyx-lobes* obtuse, hirsute or glabrous. *Corolla* $1\frac{1}{2}$–2 in. long and broad; lobes about as long as the tube, round, entire or slightly crenate, sometimes with pink marks. *Stamens* 10: filaments sparsely pilose. *Ovary* 5-celled, scaly. *Capsule* $\frac{3}{4}$ by $\frac{1}{3}$ in., erect, symmetric. *Seeds* elliptic, acute; testa close, hardly produced at the ends.

VAR. *salicifolia*; leaves very narrowly lanceolate, sometimes 3 by less than $\frac{1}{2}$ in. —Khasia, frequent.

VAR. *inæqualis*; capsule $\frac{3}{4}$ by $\frac{1}{2}$ in., ovoid, unsymmetric from a very unequal base. —Khasia; Kollong rock, alt. 5000 ft., *H. f. & T.*—This has been considered a distinct species, and may be so, but the flowers are unknown. Branches often hirsute-setose; leaves entirely without the setose ciliæ common (but sometimes wanting) in *R. formosum. Capsules* (of which there are numerous examples) more unsymmetric than in any other Indian Rhododendron.

39. **R. Veitchianum,** *Hook. Bot. Mag.* t. 4992; leaves obovate-lanceolate acute glabrous glandular-scaly beneath, corolla large white or pink wide-funnel-shaped. *Fl. des Serres*, xiv. t. 1416, xv. t. 1519–20. R. formosum, var. β, *Kurz in Journ. As. Soc.* 1877, pt. ii. 216.

MOULMEIN; alt. 7000 ft., Moolee, *Parish, Kurz.*

A shrub, 8 ft.; sometimes epiphytic; branchlets glabrous or (in Kurz's example) hirsute. *Leaves* $3\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., base cuneate; petiole $\frac{1}{4}$ in., sometimes hirsute. *Umbels* terminal, 3–8-flowered; pedicels $\frac{1}{4}$ in., glandular-scaly; bracts 1 by $\frac{1}{3}$ in., acute, villous below. *Calyx-lobes* small, unequal, sometimes hirsute. *Corolla* 2–$2\frac{1}{2}$ in. long, and broad, glandular-scaly without or nearly glabrous; lobes 5, round, crisped-crenulate. *Stamens* 12–14; filaments hairy below. *Ovary* and base of the style densely glandular-scaly; stigma large, peltate. *Capsule* not seen.—This hardly

differs from some large-flowered glabrous examples of *R. formosum*, except by the crisped-crenulate margin of the corolla.

40. **R. cinnabarinum,** *Hook. f. Rhod. Sikkim Himal.* t. 8; leaves oblong or elliptic glabrous, pedicels terminal clustered, calyx-lobes small unequal or obsolete, corolla-tube long narrow campanulate, lobes ovate, flowers orange rose or brick-red. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 80, 101; *Hook. Bot. Mag.* t. 4788. R. Roylei, *Hook. f. Rhod. Sikkim Himal.* t. 7. R. blandfordiæflorum, *Hook. Bot. Mag.* t. 4930; *Fl. des Serres* (1856), t. 1173; *Gard. Chron.* 1856, 548, *with fig.*; 1871, 236, t. 53; *Illustr. Hortic.* ser. iii. t. 112.—Rhododendron sp., *Griff. Itin. Notes*, 194, n. 1072.

SIKKIM; alt. 10–12,000 ft., *J. D. H.*, &c. BHOTAN; alt. 10,000 ft., *Griffith.*

A shrub, 4–8 ft. *Leaves* 2–3 by 1–1$\frac{3}{4}$ in., acute or obtuse, beneath mealy white or cinnamoneous with scattered glandular scales; petioles $\frac{1}{8}$–$\frac{1}{3}$ in. *Pedicels* $\frac{1}{4}$ $\frac{1}{2}$ in., squamose or glabrous; bracts glabrous with ciliate margins. *Corolla* 1$\frac{1}{4}$ by $\frac{1}{3}$ in., pendulous. *Stamens* 10; filaments pilose at the base. *Ovary* 5-celled, glandular-scaly. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in. *Seeds* ovoid or trigonous; testa close, hardly produced at all.—A most variable plant.

41. **R. Keysii,** *Nutt. in Hook. Kew Journ.* v. (1853) 353; leaves lanceolate narrowed at both ends glabrous, pedicels pseudo-terminal clustered on short axillary spurs, calyx-lobes minute, corolla-tube long cylindric lobes ovate, flowers pale brick-red whiter at the mouth. *Hook. Bot. Mag.* t. 4875; *Fl. des Serres* (1856), t. 1110; *Regel Gartenfl.* (1863) t. 415.—Rhododendron sp., *Griff. Itin. Notes*, 141, n. 655 and 190, n. 1010 and *Ic. Pl. Asiat.* t. 618.

BHOTAN; alt. 8–10,000 ft., *Griffith, Booth.*

A shrub, 2 6 ft. *Leaves* 3$\frac{1}{2}$ by 1 in., acute, base cuneate, beneath cinnamoneous with scattered glandular scales; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Pedicels* $\frac{1}{4}$ in., scaly; bracts $\frac{3}{4}$ in., hairy. *Corolla* $\frac{3}{4}$ by $\frac{1}{4}$ in., pendulous; lobes hardly spreading. *Stamens* 10; filaments woolly below. *Ovary* 5-celled, glandular-scaly. *Seeds* oblong; testa close, produced as a crest at one end.

42. **R. triflorum,** *Hook. f. Rhod. Sikkim Himal.* t. 19; leaves elliptic acute glabrous closely minutely scaly beneath, pedicels 1–5 fascicled terminal, corolla yellow, tube short campanulate, lobes ovate obtuse erect-patent. *Fl. des Serres*, vii. t. 673. R. virgatum var., *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 96. R. deflexum, *Griff. Ic. Pl. Asiat.* t. 519.—Rhodoracea, *Griff. Itin. Notes*, 192, n. 1046.

SIKKIM and BHOTAN; alt. 7–8000 ft., *Griffith, J. D. H.*, &c.

A shrub, 4–8 ft. *Leaves* 2$\frac{1}{2}$ by 1 in., obtuse at the base; petiole $\frac{1}{4}$ in. *Pedicels* $\frac{1}{8}$–$\frac{1}{2}$ in., scaly; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., obovate, scaly, ciliate; bracteoles $\frac{1}{2}$ in., linear. *Calyx-lobes* subobsolete. *Corolla-tube* $\frac{1}{3}$ in., lobes $\frac{2}{3}$ in, often scaly without. *Stamens* 10 or 8; filaments densely woolly near the base. *Ovary* 5-celled, scaly; style glabrous. *Capsule* $\frac{1}{3}$ by $\frac{1}{5}$ in. *Seeds* oblong, acute; testa close.

SUBGENUS IV. **Rhodorastrum** (Sect. *Maxim. Rhod. As. Orient.* 15). As *Eurhododendron*; but pedicels axillary, solitary, each sheathed at the base by several large caducous bracts.

43. **R. virgatum,** *Hook. f. Rhod. Sikkim Himal.* t. 26, A; leaves narrowly oblong acute glabrous glandular-scaly beneath, calyx-lobes small ovate obtuse, corolla purple, lobes 5 ovate entire spreading as long as the campanulate tube. *Hook. f. in Journ. Hortic. Soc. Lond.* vii. 81, 95 (*excl. syn.* R. triflorum); *Hook. Bot. Mag.* t. 5060.—Azalea, *Griff. Itin. Notes*, 155, n. 776.

SIKKIM; Choongtam, alt. 7–9000 ft., *J. D. H.* BHOTAN; alt. 7000 ft., *Griffith.*

A shrub, 4 ft., branchlets scaly. *Leaves* $2\frac{1}{4}$ by $\frac{2}{3}$ in., base broadly rhomboid, obscurely glandular-punctate above; petiole $\frac{1}{6}$ in. *Pedicels* $\frac{1}{4}$–$\frac{1}{3}$ in.; bracts $\frac{1}{3}$ in., ovate, pubescent. *Corolla-tube* $\frac{1}{3}$ in. *Stamens* 10 or 8; filaments sparsely pilose. *Ovary* 5-celled, scaly as is the lower portion of the style. *Capsule* $\frac{1}{3}$ by $\frac{1}{4}$ in. *Seeds* oblong; testa produced into a tail at each end shorter than the seed.

SPECIES IMPERFECTLY KNOWN.

44. R. BHOTANICUM, *Clarke*; leaves oblong or elliptic obtuse with a mucro or acute glabrous sparsely scaly beneath, flowers and fruit unknown.

BHOTAN; *Booth.*

Leaves 5 by $1\frac{1}{2}$ in., base cuneate or rhomboid, much resembling those of *R. Maddeni* but the glands beneath are sparsely scattered. *Flower-scales* in large terminal cones, very much larger than those of *R. cinnabarinum* or *R. Keysii*, broadly obovate, glabrous, scarcely scarious towards the margin, but fringed densely with brilliantly white soft hairs; in *R. Maddeni* the flower-scales have the margins scarious not fringed.—These shoots represent possibly the species referred to by Nuttall (in Hook. Kew Journ. v. (1853) 363) as a second variety of *R. camelliæflorum* "with foliage almost as robust as *R. Jenkinsii*."

45. R. PARISHII, *Clarke*; leaves elliptic narrowed at the base glabrous finely reticulated beneath without glands, petioles with loose ferruginous wool sometimes continued up the midrib beneath.

MOULMEIN; Moolee, alt. 6000 ft., *Parish*, n. 1021.

Branchlet stout with some ferruginous wool towards the extremity. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., subobtuse with a very short point, of a rich brown colour; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* and capsules unknown.

46. R. LUCIDUM, *Nutt. in Hook. Kew Journ.* v. (1853) 363; shrubby, leaves short-petioled oblong-lanceolate acute shining base cuneate glaucous and scaly beneath, flowers subsolitary, calyx-lobes somewhat large oblong-ovate obtuse glabrous, capsules ovate acute 5–8-celled.

MTS. of BHOTAN; beyond the Bhorelli, *Booth.*

Hardly distinguishable from *R. Jenkinsii* by the leaves, though very distinct in the inflorescence, which approaches nearer that of *R. camelliæflorum*. *Flowers* not seen (Nuttall).

9. **PYROLA,** *Linn.*

Perennial, glabrous herbs, with short leafy stems and erect annual simple scapes. *Leaves* alternate, long-petioled, persistent, entire or nearly so. *Flowers* in simple racemes, cernuous, white or rose; pedicels 1-bracteate. *Calyx* deeply 5-lobed, persistent. *Petals* 5, concave, sessile, deciduous. *Stamens* 10, hypogynous; filaments subulate, glabrous; anthers incompletely 4-celled, dehiscing by 2 terminal pores. *Ovary* subglobose, 5-celled: style straight declinate or curved, linear or thickened upwards, top truncate with a 5-lobed stigma; ovules very many in each cell. *Capsule* subglobose, depressed, pentagonal, 5-celled, loculicidally 5-valved from the base, crowned by the persistent style. *Seeds* minute; testa lax, produced at both ends.—Species 15, in temperate northern regions.

P. rotundifolia, *Linn.*; leaves orbicular or broadly-ovate or -obovate or elliptic, petiole about equalling the blade, calyx-segments broadly ovate or ovate-lanceolate, style equalling or longer than the petals declinate, stigmatic lobes erect or spreading.

NORTH-WESTERN and EASTERN HIMALAYA, and the Khasia Mts.—DISTRIB. Europe, N. Asia and N. America.

Glabrous. *Leaves* 1–2 in. diam., narrowed into the petiole, quite or nearly entire, coriaceous, obtuse or subacute. *Scape* 6–8 in.; raceme many-fld. *Stamens* ascending,

shorter than the styles. *Flowers* drooping about $\frac{1}{3}$ in. diam., bracts $\frac{1}{3}$ in., lanceolate, amplexicaul; floral lanceolate, about equalling the pedicels. *Petals* $\frac{1}{4}$ in. long, orbicular or obovate, white and pink. *Anther-bases* obtuse or mucronate. *Capsule* $\frac{1}{4}$-$\frac{1}{3}$ in. diam.

VAR. *rotundifolia proper*; calyx-segments ovate- or oblong-lanceolate. P. rotundifolia, *DC. Prodr.* vii. 772.—Kashmir, alt. 9–10,000 ft., *Falconer, Thomson, Clarke.*

VAR. *asarifolia*; calyx-segments triangular-ovate, leaves usually more obovate. P. asarifolia, *Mich.*; *DC. Prodr.* vii. 773. Chimaphila sp. *Griff. Itin. Notes*, 134, n. 560.—Sikkim Himalaya, alt. 9-11,000 ft., *J. D. H.*, *Anderson*. Bhotan, alt. 6800 ft., *Griffith*. Khasia Mts., alt. 5-6500 ft., *H. f. & T.*, *Lobb*.—A Japanese and American form.

ORDER LXXXIII. **MONOTROPEÆ.** (By C. B. Clarke.)

Parasitic, brown or yellowish leafless herbs. *Stem* erect, with leafy scales. *Flowers* solitary or racemose, regular. *Sepals* (sometimes like the scales) 2-6, deciduous, imbricate. *Petals* 3–6 (in the Indian species). *Stamens* 6-12, hypogynous; filaments linear. *Ovary* free, globose or fusiform, 1-6-celled; style cylindric, stigma peltate; ovules very numerous on axile or parietal placentæ. *Capsule* loculicidally 4–6-valved. *Seeds* very many, minute; testa often loose, produced, saccate; embryo minute, undivided.—Species 10-12, in the forests of the N. hemisphere.

* *Anthers peltate, ovary ovoid, placentas axile.*

Flowers solitary. Petals hardly saccate at base . . . . 1. MONOTROPA.
Flowers racemose. Petals saccate at base . . . . 2. HYPOPITHYS.

** *Anthers oblong, ovary fusiform, placentas parietal.*

Scape 1–3-flowered. Petals 3, narrow . . . . 3. CHEILOTHECA.

1. **MONOTROPA,** *Linn.*

Stem 1-flowered. *Sepals* 4, resembling scales. *Petals* 5–6, obovate-oblong, scarcely saccate at base, at length deciduous. *Stamens* 10–12; anthers peltate, horizontal, dehiscing by transverse slits. *Ovary* 5-celled; ovules very many on axile placentæ. *Capsule* 5-celled, 5-valved.—Species 1 or 2, American and Himalayan.

M. uniflora, *Linn.*; *DC. Prodr.* vii. 781; *Lamk. Ill.* t. 362, fig. 1; *Don Prodr.* 151; *Hook. Exot. Fl.* t. 85; *Maxim. Mel. Biol. Dec.* xii. 626. M. Morisoniana, *Michx. Fl. Bor. Am.* i. 266; *DC. l. c.*; *Don Prodr.* 152. Monotropa, *Griff. Ic. Pl. Asiat.* t. 523.

TEMPERATE HIMALAYA; alt. 6–8000 ft. KHASIA MTS.; alt. 4–6000 ft., frequent. DISTRIB. Corea, Japan, N. America.

Glabrous, 6–15 in. *Scales* $\frac{3}{4}$ in., ovate-lanceolate. *Flower* nodding. *Petals* $\frac{3}{4}$ in.; stamens and stigma nearly level with their summits. *Ovary* and capsule globose. *Style* at first short, in fruit often $\frac{1}{4}$ in. *Filaments* pilose below. *Fruit* erect.

2. **HYPOPITHYS,** *Scop.*

Flowers in a terminal raceme; bracts scaly. *Sepals* 4-5, obovate-lanceolate, hyaline, deciduous. *Petals* 4–5, obovate-oblong, saccate at the base, deciduous. *Stamens* 8–10; anthers peltate, horizontal, dehiscing by transverse slits. *Ovary* 5-celled; ovules on axile placentæ. *Capsule* 4-5-celled, loculicidally 4–5-valved —Species 2 (or 1); throughout the N. hemisphere.

H. lanuginosa, *Nutt. Gen. Am.* i. 271; stem raceme and flowers pubescent, petals densely hairy within. *DC. Prodr.* vii. 781.

KASHMIR; alt. 8500 ft., *Aitchison, C. B. Clarke.* KHASIA MTS.; alt. 4–5000 ft., *H. f. & T.*, &c.—DISTRIB. Amurland, Japan, N. America.

Scapes 6–18 in. *Scales* $\frac{3}{4}$ in., ovate-oblong. *Pedicels* $\frac{1}{4}$–$1\frac{1}{2}$ in. *Petals* $\frac{1}{2}$ in., yellow or white; stamens and stigma nearly level with their summits. *Ovary* and capsule globose.—This only differs from the European species (Monotropa Hypopitys, *Linn.*) by its hairiness; and is considered a variety thereof by Maximowicz.

3. **CHEILOTHECA,** *Hook. f.*

Stem erect, simple or forked; branches 1-flowered. *Sepals* 3–4, oblong-lanceolate. *Petals* 3, erect, linear-oblong, obtuse, base not saccate. *Stamens* 6; anthers linear-oblong, erect, dehiscing on the sides by longitudinal slits. *Ovary* fusiform, 1-celled, narrowed into the short cylindric style; stigma globose-conical; placentæ 6, parietal, bifid, the long branches covered on all sides by numerous ovules. *Fruit* unknown.

C. khasiana, *Hook. f. in Gen. Pl.* ii. 608.

KHASIA MTS.; Mushai, near River Oongkot, alt. 3500 ft., *H. f. & T.*

Stem 4–6 in. *Scales* 1 by $\frac{1}{4}$ in., lanceolate, acute, densely imbricate. *Petals* 1 in., yellow-red. *Stamens* as long as the petals, brown. *Pistil* $\frac{3}{4}$ by $\frac{1}{6}$ in., glabrous.

ORDER LXXXIV. **EPACRIDEÆ.** (By C. B. Clarke.)

Shrubs or small trees. *Leaves* alternate, articulated with the branch, coriaceous, entire, longitudinally nerved. *Flowers* solitary or racemose, axillary or terminal, usually bracteolate. *Calyx* 5–4-partite; segments coriaceous, striate, imbricate, persistent. *Corolla* 5–4-fid. *Stamens* 5–4, usually on the corolla-tube; anthers oblong, 1-celled (spuriously 2-celled), dehiscing along their whole length by a single slit. *Ovary* globose, 1–10-celled; style terminal, cylindric, stigma subcapitate; ovules in each cell 1 or many. *Fruit* drupaceous with 2–5 1-seeded pyrenes, or a many-seeded capsule. *Seeds* small, albuminous.—Species 320, nearly all Australian, a few Polynesian, 1 Fuegian, a few Malayan.

1. **LEUCOPOGON,** *R. Br.*

Shrubs. *Flowers* small, white, in axillary or terminal spikes or racemes; rachis terminating in an abortive flower; bracteoles 2–3 under the calyx. *Corolla* campanulate, lobes 5, hairy within, valvate in bud. *Ovary* 2–5-celled; style terminal; ovule solitary in each cell, pendulous. *Drupe* scarcely fleshy, 1–5-celled.—Species 130, 118 Australian, the others Polynesian and Malayan.

L. malayanus, *Jack in Mal. Misc.* i. v. 20, and *in Hook. Bot. Misc.* ii. 71; leaves narrowly lanceolate glabrous shining, racemes 3–7-flowered much shorter than the leaves, rachis villous. *Wall. Cat.* 3720, and *in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 301; *DC. Prodr.* vii. 744; *Kurz in Journ. As. Soc.* 1877, ii. 217, and *For. Fl.* ii. 95. Styphelia malayica, *Spreng. Syst. cur. post*, 67.

MALACCA and SINGAPORE; *Jack*, &c.—DISTRIB. Malay Isles and Borneo.

A shrub, 3–6 ft; branches densely leafy. *Leaves* 2 by $\frac{1}{3}$ in., acute, mucronate. *Racemes* $\frac{1}{2}$ in.; calyx enveloped by the ovate bracteoles; segments $\frac{1}{8}$–$\frac{1}{6}$ in., elliptic-oblong. *Corolla-tube* $\frac{1}{6}$ in.; lobes $\frac{1}{8}$ in., spreading. Hypogynous *scales* 5, free. *Style* hairy or perfectly glabrous. *Drupe* $\frac{1}{8}$–$\frac{1}{6}$ in. diam.

VAR. *moluccana*, Kurz in Journ. As. Soc. 1877, pt. ii. 217, and For. Fl. ii. 96; leaves $\frac{1}{2}$–1 in. subulate-pointed. *L. moluccanum*, Scheff. Obs. Phyt. iii. 97 (sp.).—Tenasserim, *Helfer*; Keddah Peak, *Low.*—*L. moluccanum*, Scheff., has the peduncles 1–2-flowered; in Helfer's Tenasserim plant, the racemes are (sometimes at least) 3–5-flowered.

ORDER LXXXV. DIAPENSIACEÆ. (By C. B. Clarke.)

Very small, prostrate shrubs. *Leaves* alternate or crowded, entire or toothed. *Flowers* solitary or racemose. *Calyx* 5-partite, persistent; segments imbricate. *Corolla* hypogynous; lobes 5, imbricate. *Stamens* 5, on the throat of the corolla, alternate with its lobes; anthers dehiscing by slits. *Disc* 0. *Ovary* free, globose, 3-celled; style cylindric, stigma shortly 3-lobed; ovules few or many in the inner angles of the cells. *Capsule* coriaceous, 3-celled, loculicidally 3-valved. *Seeds* many, minute, albuminous.—Species 8, in N. America, Europe, Japan, and the Eastern Himalaya.

1. DIAPENSIA, *Linn.*

Very small, glabrous shrubs. *Leaves* crowded, obovate-oblong, entire, coriaceous. *Flowers* at the ends of the branches, solitary, peduncled, white or rose-red. *Calyx* 2–3-bracteate; sepals broadly ovate, obtuse. *Corolla* campanulate, persistent; lobes spreading, round. *Anthers* subsessile, cells oblique; staminodes 0. *Seeds* very many, minute, subcubic; testa lax.

D. himalaica, *H. f. & T. in Hook. Kew Journ.* ix. 372, t. 12; leaves subacute, flowers subsessile, tube of the corolla twice as long as the calyx, fruiting peduncle 1–3 in.

SIKKIM HIMALAYA; alt. 10–14,000 ft., Lachen and Chola Pass, *J. D. H.*, &c.
Densely tufted. *Leaves* $\frac{1}{6}$ in. *Sepals* in flower-time $\frac{1}{8}$–$\frac{1}{6}$ in., ovate; in fruit nearly $\frac{1}{4}$ in., obovate-oblong. *Corolla-tube* $\frac{1}{5}$ in., lobes $\frac{1}{4}$ in. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in. diam.

ORDER LXXXVI. PLUMBAGINEÆ. (By C. B. Clarke.)

Herbs or undershrubs. *Flowers* in terminal scapes or peduncles, capitate, racemed or panicled; bracts often scarious on the margins, usually sheathing the flower; bracteoles 2. *Calyx* inferior, tubular, 5–10-ribbed, often hyaline between the ribs, mouth frequently funnel-shaped, scarious. *Petals* 5, free or connate at the base into a very short tube with the filaments, rarely united into a linear tube, spreading. *Stamens* 5, opposite the petals; filaments nearly free or adnate below to the corolla; anthers oblong. Hypogynous *disc* 0. *Ovary* superior, 1-celled, 5-angular above; styles 5, distinct from the base or connate below, stigmas subcapitate; ovule 1, pendulous from a basal ascending funicle, anatropal. *Capsule* membranous or the apex hardened, included in the calyx (in *Ægialitis* linear, long-exsert), circumsciss or rupturing near the thin base, the hardened apex often 5-valved. *Seeds* cylindric (in *Ægialitis* elongate), pendulous; albumen various or 0; radicle superior.—Species 200, throughout the world, mostly in maritime or saline places.

TRIBE I. **Staticeæ.** *Styles* 5, distinct; stigmas subcapitate. *Stamens* very shortly united at the base into a tube with the corolla.

Large shrub, with broad petioled leaves	1. ÆGIALITIS.
Herbs or small shrubs, with linear prickly leaves	2. ACANTHOLIMON.
Herbs or small shrubs, with obovate leaves	3. STATICE.

TRIBE II. **Plumbageæ.** *Style* 1, filiform, divided into 5 stigmatose branches.

Calyx glandular, stamens free, flowers spicate	4. PLUMBAGO.
Calyx eglandular, stamens adnate to the middle of the corolla-tube, flowers capitate	5. CERATOSTIGMA.
Calyx eglandular, 5-winged, stamens free, flowers spicate . . .	6. VOGELIA.

1. ÆGIALITIS, *R. Br.*

A glabrous shrub. *Leaves* alternate, broad, coriaceous; petiole dilated at base, amplexicaul. *Racemes* panicled; bract sheathing the pedicel and including the 2 bracteoles. *Calyx* tubular, tough, 5-ribbed; teeth 5, short. *Petals* linear, white, connate at base with the filaments into a persistent tube, deciduous above the tube. *Anthers* oblong. *Styles* distinct, from the angles of the ovary; stigmas capitate. *Fruit* (in *Æ. annulata*) linear, long-exserted from the calyx, slightly pentagonal, dehiscing finally along the angles. *Seed* elongate, albumen 0. —Species 2, littoral, an Australian and a Malayan.

Æ. rotundifolia, *Roxb. Fl. Ind.* ii. 111; leaves orbicular base mostly rounded, calyx $\frac{1}{2}$ in., young capsule ovoid pentagonal. *Wall. Cat.* 7240; *Griff. Notul.* iv. 207. Æ. annulata, *Kurz in Journ. As. Soc.* ii. 217, and *For. Fl.* ii. 96, *not of R. Br.* Ægianilites rotundifolia, *Presl Bot. Bermerk.* 103.

Mangrove swamps; BENGAL; abundant. MERGUI; *Griffith.* ANDAMANS; *Kurz.* MALACCA; *Griffith.*

Height 3–8 ft. *Leaves* $2\frac{1}{2}$–3 in.; petiole $2\frac{1}{2}$ in. *Bract* $\frac{1}{3}$ in.; pedicels stout. *Young capsule* $\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., shining, horny; endocarp very tough, spongy. *Seed* narrowly oblong.—This plant has been united with the Australian *Æ. annulata*, R. Br. (DC. Prodr. xii. 621); in which the calyx hardly exceeds $\frac{1}{4}$ in. The ripe fruit of the Indian species is unknown; but the young capsules are much broader than in the fruit of *Æ. annulata* at any stage. Corolla-tube $\frac{1}{6}$ in. long, in *Æ. annulata* a mere ring.

2. ACANTHOLIMON, *Boiss.*

Small, prickly shrubs. *Leaves* crowded, linear, spinescent. *Scapes* many-flowered; rachis brittle, simple or dichotomous; bracts usually 3. *Calyx-tube* cylindric, 10-ribbed; limb widely funnel-shaped, scarious, subentire, with 5 sometimes excurrent nerves. *Petals* oblong or obovate, united shortly at the base into a tube with the stamens, rose or white, contorted in bud. *Filaments* linear; anthers oblong. *Styles* distinct, at the angles of the ovary; stigmas capitate. *Utricle* included within the calyx, oblong or pentagonal, membranous; seed more or less albuminous.—Species 80, Greece to Kashmir, most numerous in Persia.

A. lycopodioides, *Boiss. in DC. Prodr.* xii. 632; leaves linear-lanceolate, spikes dichotomous short, bracts coriaceous with hyaline margins, ribs of the wide-spreading calyx-limb glabrous. *Bunge Acanthol.* 20. A. tibeticum, *Herb. Ind. Or. H. f. & T.* Statice lycopodioides, *Girard in Ann. Sc. Nat.* 3, ii. 330, *excl. syn. Willd.*

NORTH KASHMIR; alt. 11–14,000 ft., frequent, *Thomson*, &c.—DISTRIB. Kashgar.

Densely tufted. *Leaves* 1 by $\frac{1}{12}$ in., needle-pointed. *Scapes* 1–2 in., minutely scabrous. *Bracts* $\frac{1}{5}$ by $\frac{1}{6}$ in., inner wholly scarious except the midrib. *Calyx-tube* $\frac{1}{6}$–$\frac{1}{5}$ in., pilose without; limb white, subtruncate. *Petals* $\frac{1}{4}$ in., rose-red.

3. STATICE, *Linn.*

Herbs or small shrubs. *Leaves* alternate, radical often rosulate, entire (in the Indian species), not spinescent. *Scapes* branched, many-flowered; bracts small, amplexicaul, margins scarious. *Calyx* tubular or funnel-shaped ribbed; limb scarious, spreading, 5-nerved, sometimes laciniate or plumose. *Petals* spathulate-oblong, entire or bipartite, united at base into a short tube with the stamens. *Styles* distinct, at the angles of the ovary; stigmas subcapitate. *Utricle* included within the calyx, oblong fusiform, membranous; seed more or less albuminous.—Species 100, cosmopolitan, especially in saline places.

SECT. I. **Limonium.** *Petals* entire or emarginate.

1. **S. Stocksii,** *Boiss. in DC. Prodr.* xii. 664; leaves spathulate-oblong glabrous fleshy, calyx pilose without limb subtruncate. *Wight Ill.* ii. 225, t. 178; *Hook. Ic. Pl.* t. 837; *Boiss. Fl. Orient.* iv. 868.

SCINDE; *Stocks, Dalzell.*—DISTRIB. Beloochistan.

Height 6–10 in.; branches woody, leafy. *Leaves* $\frac{3}{4}$ by $\frac{1}{3}$ in., obtuse, tapering much at the base; petiole hardly any. *Scapes* dividing into a secund panicle; bracts $\frac{1}{6}$ in., elliptic, herbaceous, reddish. *Calyx* $\frac{1}{3}$ in., ribs long-ciliate. *Petals* longer than the calyx, entire or emarginate, rose-pink. *Anthers* long-exsert.

2. **S. cabulica,** *Boiss. in DC. Prodr.* xii. 666; leaves all radical rosulate spathulate-oblong obtuse mucronate, panicle large dichotomous, branches long, calyx minutely pilose without, limb at first subtruncate ultimately with linear recurved divisions. *Boiss. Fl. Orient.* iv. 871.

PUNJAB; Jhelum valley and lower hills west of the Indus, alt. 2–4000 ft., *Stewart.*—DISTRIB. Affghanistan.

Annual. *Leaves* $1\frac{1}{2}$ by $\frac{2}{3}$ in., densely rosulate. *Scape* 1–3 ft., solitary, erect, glabrous; flowers subsessile, scattered along the branches; bracts $\frac{1}{4}$ in., ovate or oblong, obtuse, mucronate, coriaceous, scarious margin narrow. *Calyx-tube* $\frac{1}{4}$–$\frac{1}{3}$ in., very narrow; limb at first funnel-shaped, subtruncate, scarious, with 5 ribs; in fruit the membranous portion breaks up and almost entirely disappears, the 5 ribs are recurved.

SECT. II. **Schizopetalum.** *Petals* bifid half-way down.

3. **S. macrorrhabdos,** *Boiss. Diagn.* 2, iv. 67, and *Fl. Orient.* iv. 869; var. *Thomsoni,* Clarke; leaves all radical rosulate spathulate-orbicular obtuse or emarginate rarely minutely mucronate, calyx with tufts of small spreading hairs. Statice, sect. Schizopetali sp. altera, *Hook. f. in Gen. Pl.* ii. 626.

WEST TIBET; *Falconer*; Ladak, *T. Thomson.* Baltisthan, alt. 9000 ft., *Clarke.*

Annual. *Leaves* 2 by $1\frac{1}{2}$–2 in. *Scapes* 1–3 ft., glabrous; flowers in clusters of 2–4, sessile along the branches; bracts $\frac{1}{4}$ in., ovate, mucronate, coriaceous with scarious margin. *Calyx-tube* $\frac{1}{3}$ in, limb funnel-shaped, truncate, scarious, 5-ribbed. *Petals* divided to the base of the lamina into two lanceolate-linear divisions.—This was considered specifically distinct from *S. macrorrhabdos* (a native of Affghanistan and Beloochistan) by Sir J. D. H., and would be so according to Boissier's views.

4. PLUMBAGO, *Linn.*

Herbs or undershrubs; branches diffuse. *Leaves* alternate, entire. *Flowers* spiked; bracts and bracteoles shorter than the calyx. *Calyx* tubular, covered with stalked glands; limb 5-fid. *Corolla-tube* long, slender; lobes 5, round, patent. *Stamens* free; filaments linear, dilated at base; anthers oblong. *Ovary* narrowed at the apex; style slender, with 5 terminal branches stigmatose nearly throughout their length. *Capsule* membranous, circumsciss near the base.—Species 10, warmer regions of both hemispheres.

1. **P. zeylanica,** *Linn.*; *DC. Prodr.* xii. 692; leaves ovate suddenly narrowed into the petiole, rachis of the spike pubescent or glandular, corolla white, base of style glabrous. *Roxb. Hort. Beng.* 13, and *Fl. Ind.* i. 462; *Wall. Cat.* 7241; *Wight Ill.* t. 179; *Dalz. & Gibs. Bomb. Fl.* 220; *Kurz in Journ. As. Soc.* 1877, ii. 217; *Boiss. Fl. Orient.* iv. 875. P. auriculata, *Blume Bijd.* 736. Thela alba, *Lour. Fl. Cochinch.* 119.—*Rheede Hort. Mal.* x. t. 8.

Throughout INDIA, much cultivated and readily spreading; wild in the south. Kurz thinks not wild in Birma; Watt thinks wild in Bengal.—DISTRIB. Throughout the tropics of the Old World.

Rambling several feet. *Leaves* 3 by $1\frac{1}{2}$ in., acute, glabrous, or puberulous; petiole $\frac{3}{4}$ in., base dilated, amplexicaul. *Spikes* 4–12 in., often branched; bracts $\frac{1}{5}$ in, ovate, acute. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{10}$ in.; teeth very short. *Corolla-tube* $\frac{3}{4}$ in.; lobes $\frac{1}{3}$ in.

2. **P. rosea,** *Linn.*; *Roxb. Fl. Ind.* i. 462; leaves elliptic tapering to the short petiole, rachis of the spike glabrous, corolla red, base of style hairy. *Wall. Cat.* 7242; *Bot. Mag.* tt. 230, 5363; *Kurz in Journ. As. Soc.* 1877, pt. ii. 218. P. coccinea, *Boiss. in DC. Prodr.* xii. 693. Thela coccinea, *Lour. Fl. Cochinch.* 119.—*Rumph. Herb. Amb.* v. t. 168. *Rheede Hort. Mal.* x. t 9.

Valleys in SIKKIM and KHASIA, wild (?). India, often cultivated; Thwaites thinks not wild in Ceylon; Kurz thinks not wild in Birma.—DISTRIB. South-east Asia, cultivated.

Altogether resembling *P. zeylanica*, and perhaps only a cultivated variety of it.

5. CERATOSTIGMA, *Bunge.*

Herbs or shrubs. *Leaves* alternate, obovate or lanceolate, bristle-ciliate. *Flowers* capitate; bracts and bracteoles sheathing. *Calyx* tubular, without glands, deeply 5-fid; segments narrow, 3-striate. *Corolla-tube* elongate, slender; lobes round, patent. *Stamens* adnate to the middle of the corolla-tube, filaments linear; anthers oblong. *Ovary* pentagonal; tip conical; style filiform, with 5 stigmatose branches. *Capsule* included in the calyx, circumsciss close to the base, sub-5-valved.—Species 3-4; Chinese, Bhotanese and Abyssinian.

C. Griffithii, *Clarke*; shrubby, ferruginous-hirsute, leaves spathulate obovate, calyx-segments linear. Plumbago ?, *Griff. Itin. Notes*, 189, n. 1007.

BHOTAN; between Woollookka and Lamnoo very common, *Griffith* (alt. 8000 ft. ?), (Kew Distrib. n. 4181).

A low densely branched shrub; leaves red-margined, calyces and bracts brown-ciliate; flowers a fine blue (Griffith).—Griffith's specimen has been badly preserved; the leaves on it are $\frac{3}{4}$ by $\frac{1}{3}$ in.; but it had probably much larger leaves.

6. VOGELIA, *Lamk.*

Small shrubs, branches long. *Leaves* alternate, entire. *Spikes* terminal, panicled; bracts and bracteoles small. *Calyx* deeply 5-fid, with 5 broad transversely undulate wings between the ribs. *Corolla-tube* cylindric; lobes 5, round, patent. *Stamens* free; filaments linear, base dilated; anthers oblong. *Ovary* oblong-fusiform, somewhat pentagonal; style filiform, branches 5, stigmatose throughout. *Capsule* included in the calyx, circumsciss at the very base.—Species 2, a S. African and an Indo-Arabian.

V. indica, *Gibs. ms.*; *Wight in Calc. Journ. Nat. Hist.* vii. 17, and *Ic.* 1075; leaves perfoliate elliptic obtuse or orbicular. *DC. Prodr.* xii. 696; *Boiss. Fl. Orient.* iv. 876. V. arabica, *Boiss. in DC. Prodr.* xii. 696; *Dalz. & Gibs. Bomb. Fl.* 220.

WESTERN INDIA; Canara, *Gibson*, &c.; Mt. Aboo, *Stocks*, *Brandis.*—DISTRIB. Arabia.

Puberulous or glabrescent. *Leaves* $2\frac{1}{2}$ by $1\frac{3}{4}$ in. (sometimes twice as large), deeply cordate, more or less perfoliate. *Spikes* dense. *Calyx* $\frac{1}{3}$ by $\frac{1}{6}$ in. *Corolla-tube* $\frac{2}{3}$ in.; lobes $\frac{1}{3}$ in. *Style* hairy at the base.

ORDER LXXXVII. **PRIMULACEÆ.** (By J. D. Hooker.)

Perennial, rarely annual herbs. *Leaves* all radical, or if cauline opposite alternate or whorled, exstipulate. *Flowers* hermaphrodite, regular. *Calyx* inferior (except *Samolus*), 5- rarely 4–9-cleft. *Corolla* hypogynous (except *Samolus,* 0 in *Glaux*), rotate bell- or funnel-shaped 5- rarely 4–9-cleft. *Stamens* on the corolla-tube, opposite its lobes (hypogynous in *Glaux*), with sometimes alternating staminodes, filaments usually short; anthers 2-celled, dehiscing longitudinally. *Ovary* 1-celled; style short or long, stigma undivided; ovules many, usually amphitropous on a free central placenta. *Capsule* dehiscing transversely or by valves, few or many-seeded. *Seeds* minute, usually angular, often sunk in the placenta, albumen fleshy or horny; embryo transverse.—Species about 80, chiefly N. temperate and alpine.

TRIBE I. **Primuleæ.** *Corolla-lobes* imbricate. *Ovary* superior.

* *Capsule dehiscing by valves.*

Corolla salver- or funnel-shaped, tube long. Stamens on the corolla-tube, anthers obtuse . . . . 1. PRIMULA.
Corolla salver-shaped or almost rotate, tube very short. Stamens on the corolla-tube, anthers obtuse . . . . 2. ANDROSACE.
Corolla funnel-shaped. Stamens at the base of the corolla, anthers acuminate . . . . 3. CORTUSA.

** *Capsule circumsciss at the top.*

Corolla 7-lobed . . . . 4. BRYOCARPUM.

TRIBE II. **Lysimachieæ.** *Corolla-lobes* contorted. *Ovary* superior.

* *Capsule dehiscing by valves.*

Corolla 5–6-cleft . . . . 5. LYSIMACHIA.
Corolla 0 . . . . 6. GLAUX.

** *Capsule circumsciss.*

Corolla 5-partite, exceeding the calyx . . . . 7. ANAGALLIS.
Corolla 4–5-lobed, shorter than the calyx . . . . 8. CENTUNCULUS.

TRIBE III. **Samoleæ.** *Corolla-lobes* imbricate. *Ovary* ½-inferior.

Herbs, leaves alternate . . . . 9. SAMOLUS.

1. **PRIMULA,** *Linn.*

Perennial scapigerous herbs. *Flowers* umbelled or whorled, rarely solitary, often dimorphic, one form having the stamens low and stigma high in the corolla-tube, the other having the stamens high and stigma low. *Calyx* 5-cleft. *Corolla* funnel- or salver-shaped, throat naked or with folds opposite the lobes (annulate); lobes 5, spreading or incurved. *Stamens* 5, included; anthers obtuse. *Ovary* ovoid, obovoid or globose. *Capsule* globose, oblong or cylindric, 5-valved; valves simple or 2-fid. *Seeds* angular or subglobose, peltately attached.—Species about 80; distribution of the order.

The natural classification of *Primulæ* is a difficult task, owing to the great variability of all the organs. I quite believe that various of the Himalayan species are but highly developed states of European and N. Asiatic ones, but to demonstrate this it would be necessary to compare living specimens. Of the two natural divisions of

the genus—those with the margins of the leaves revolute, and those with them described as involute in vernation—the first embraces all the Indian species but *P. floribunda*, of which the vernation is very obscure and conduplicate. Under the first (A) of the two primary divisions here proposed (these are purely artificial, and proposed for convenience sake), all the species allied to *P. sinensis* (namely, 1, 2, 5, 7, 8) will be found; of the others, *P. pulchra* is closely allied to *P. Kingii*, *P. reticulata* to *P. sikkimensis*, and *P. Clarkei* to *P. petiolaris*. The sections established under the second division (B) are, I think, for the most part natural, and follow one another in a fairly good sequence. The form of the top of the ovary, of the stigma, and of the seeds, afford good characters; but I have not been able to apply them sectionally.

A. Leaves on long slender unwinged petioles, orbicular oblong or cordate, margins revolute in vernation. (See *P. petiolaris, sibirica, involucrata,* and *tibetica* in B).

* *Quite or nearly glabrous, mealy or not.*

1. **P. rotundifolia,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 18; *Cat.* 605; more or less mealy, leaves 1–4½ in. diam. orbicular-cordate toothed crenate or erose, umbels often superposed many-fld., bracts many subulate, corolla purple, mouth annulate, limb flat, capsule oblong exserted. *Duby in DC. Prodr.* viii. 41; *Don Prodr.* 79. P. odontophylla, *Wall. Cat.* 7016.

Temperate Himalaya; from Kashmir, alt. 11,000 ft., to Sikkim, alt. 12–13,000 ft.

Buds densely clothed with sulphurous meal. *Leaves* membranous, sometimes lobulate; petiole 6–12 in. *Scape* as tall and inflorescence puberulous and mealy; bracts many. *Corolla-tube* twice as long as the calyx; limb flat, ½–¾ in. diam.; lobes obovate or obcordate. *Ovary* with a thickened lobulate crown; stigma cuneate. *Capsule* ¼–½ in. *Seeds* pale, $\frac{1}{25}$ in., irregularly ellipsoid, coarsely papillose.

2. **P. Gambeliana,** *Watt in Journ. Linn. Soc. Bot. ined.*; buds mealy, leaves ¼–1 in. diam. orbicular-cordate toothed, umbels few-fld., bracts 1–3 subulate, corolla purple, mouth annulate, lobes orbicular emarginate.

Sikkim Himalaya; Jongri, alt. 14,000 ft., *Watt.*

A smaller plant, with much fewer and larger flowers, than *P. rotundifolia*, but I have seen only four specimens from the one known locality. *Leaves* membranous; petiole not sheathed at the base as in *P. pulchra*, which this a good deal resembles. *Scape* and inflorescence quite glabrous. *Corolla* limb concave, 1–1½ in. diam. *Ovary* and *stigma* as in *P. rotundifolia*. *Fruit* unknown.

3. **P. pulchra,** *Watt in Journ. Linn. Soc. Bot. ined.*; glabrous, not mealy, basal sheaths long membranous, leaves oblong or ovate-oblong, glaucous beneath, base rounded or cordate, tip rounded, margin waved, scape short, bracts filiform or subulate membranous, flowers 2–10 loosely umbelled, corolla purple, tube funnel-shaped, mouth obscurely annulate, lobes broad obcordate.

Sikkim Himalaya; Lachen, alt. 12–14,000 ft., *J. D. H.*; Jongri, *Watt.*

Sheaths 1–1½ in. long, embracing the petioles. *Leaves* few, blade 1–1½ in., midrib stout, nerves few; petiole 1–1½ in. *Scape* about equalling the petiole; bracts much shorter and more slender than the very unequal pedicels. *Calyx* ¼–⅓ in., terete. *Corolla* very large for the size of the plant, ¾–1 in. diam. *Ovary* globose, subacute; stigma globose. *Fruit* unknown.

4. **P. reticulata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 21; *Cat.* 608; glabrous, slightly mealy or not, leaves very long-petioled oblong-cordate obtuse crenate or doubly crenate reticulate glaucous beneath, scape very tall, bracts large linear-oblong or lanceolate, base not produced, calyx-lobes short acute recurved, corolla yellow, tube funnel-shaped slender much exserted,

mouth not annulate, ovary obovoid. *Duby in DC. Prodr.* viii. 41. P. altissima *and* P. speciosa, *Don Prodr.* 78.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 11–15,000 ft., *J. D. H., Elwes.*

Rootstock very small. *Leaf-blade* 2–3 in.; petiole 4–6 in., very slender. *Scape* 12–16 in., very slender; inflorescence sometimes mealy; flowers nodding, slightly fragrant; bracts regularly placed, but unequal in size, broad, sometimes toothed. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., campanulate, quite terete or 5-ribbed. *Corolla-tube* nearly $\frac{1}{2}$ in.; lobes erecto-patent, small, rounded, or notched. *Fruit* not seen. Wallich describes the leaves as slightly pubescent beneath, which I do not observe. A close ally of *P. sikkimensis.*

5. **P. vaginata,** *Watt in Journ. Linn. Soc. Bot. ined.*; puberulous or glabrescent, not mealy, leaves $\frac{1}{2}$ in. diam. orbicular deeply cordate 7-lobed one third way, lobes 3-fid, petiole with a broad basal sheath, scape 2–4 in., umbel 3–6-fld., pedicels very unequal, bracts linear, calyx-lobes short, corolla lilac, tube funnel-shaped, mouth annulate, lobes 2–4-fid.

SIKKIM HIMALAYA; Laghep, alt. 10,000 ft., *Clarke.*

Rootstock small, woody. *Leaves* puberulous or glabrous; petiole equalling the blade, abruptly dilated at the very base into a broad membranous sheath. *Scape* glabrous; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. *Calyx* campanulate, lobes ovate acute. *Corolla-tube* not twice the length of the calyx; limb $\frac{1}{3}$ in. diam. *Ovary* globose, acute. *Fruit* unknown.

6. **P. Clarkei,** *Watt in Journ. Linn. Soc. Bot. ined.*; quite glabrous, leaves 1–1$\frac{1}{2}$ in. orbicular- or elliptic-cordate sharply toothed or crenate, tip rounded, scape 0, pedicels equalling or shorter than the petioles, calyx broadly campanulate, lobes short, corolla-tube slender, mouth not annulate, limb flat, lobes 2-fid, capsule globose included.

KASHMIR; at Poosiana, alt. 7000 ft., *Clarke.*

Habit of a *Viola*. *Rootstock* slender, woody. *Leaves* membranous, nerves very slender; petiole 2–4 in., very slender, base narrowly sheathing. *Pedicels* 2–3, slender. *Corolla-tube* $\frac{1}{3}$ in., lobes narrow. *Ovary* globose, acute, stigma capitate. *Seeds* black, subglobose, minutely papillose, $\frac{1}{40}$ in. diam.

** *Pubescent or tomentose with flaccid jointed hairs.*

7. **P. mollis,** *Hook. Bot. Mag.* t. 4798; softly pubescent or tomentose, not mealy, leaves 3–5 in. diam. orbicular deeply cordate obtusely lobulate and erose, petiole stout, scape long, flowers in 2–5 loose superposed whorls, bracts linear-lanceolate, corolla rosy, mouth annulate, limb flat, lobes obovate or obcordate.

EASTERN HIMALAYA; Bhotan, *Booth.*

A near ally of *P. cortusioides*, and of the common garden *P. sinensis*. *Crown* without sheathing scales. *Leaves* rather thick, pubescent on both surfaces; petiole 3–5 in., base shortly sheathing. *Scape* and inflorescence 12–18 in.; whorls distant, 3–6-fld., pedicels 1–1$\frac{1}{2}$ in. *Calyx* membranous, broadly campanulate, loose, lobes acuminate. *Corolla* $\frac{3}{4}$ in. diam. *Ovary* globose, acute, upper half thickened; stigma globose. *Fruit* unknown.

8. **P. geraniifolia,** *Hook. f.*; very slender, softly pubescent, not mealy, leaves 2–3 in. diam. orbicular deeply cordate acutely lobulate all round lobules toothed, petiole very long, scape very slender, flowers in simple or superimposed whorls, bracts few linear, corolla lilac, mouth annulate, lobes obcordate.

E. TIBET; Chumbi valley (between Sikkim and Bhotan), alt. about 10,000 ft., *King.*

Rootstock horizontal. *Leaves* few, lobes 10–12, pubescent on both surfaces; petiole 2–5 in. *Scape* twice as long as the leaves; bracts small; pedicels slender. *Calyx* glabrous, campanulate, cleft half way, teeth acute. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., tube twice as long as the calyx, funnel-shaped.—A near ally of the European and Siberian *P. cortusoides*, and of the Turkestan *P. Kauffmanniana*, Regel, but the acute lobing of the broader leaf is very different.

9. **P. filipes,** *Watt in Journ. Linn. Soc. Bot. ined.*; sparsely pubescent, not mealy, leaves 1–1$\frac{1}{2}$ in. orbicular ovate or oblong cordate entire lobulate or toothed, petiole as long as the blade very slender, scape shorter than the leaves 6–8-fld., calyx-lobes short very broad, corolla flesh-coloured, mouth not annulate, limb flat, capsule globose included, seeds very minute smooth. Primula, *Griff. Itin. Notes,* 123, n. 396; *Notul.* iv. 299; *Ic. Pl. Asiat.* t. 485, f. 1.

Bhotan; rocks near Chuka, alt. 6500 ft., *Griffith.*

Rootstock elongate, woody. *Leaves* membranous. *Scape* about equalling the petiole, slender in flower, thickened in fruit; bracts small, subulate. *Calyx* broadly campanulate. *Corolla-tube* $\frac{1}{3}$ in., three times as long as the calyx, funnel-shaped; limb as much broad; lobes obovate, 2-lobed. *Seeds* $\frac{1}{60}$ in., dark brown, obtusely-angled.—Allied to the Chinese *P. obconica*, Hance (*P. poculiformis*, Bot. Mag. t. 6582), but much smaller and more delicate, and the corolla-tube is longer.

10. **P. Listeri,** *King ms.*; pubescent, not mealy, rootstock woody, leaves 1–1$\frac{1}{2}$ in. orbicular-cordate sinuate-lobed entire or denticulate very membranous, petiole equalling the blade or longer very slender, scapes shorter than the petiole few-fld., bracts few linear, calyx campanulate, lobes broad short, corolla rose-pink, tube funnel-shaped, mouth not annulate.

Sikkim Himalaya; Tonglo and the Singalelah ranges, in bamboo jungles, alt. 9–10,000 ft.

I retain this species as distinct from *P. filipes* with great doubt, having very imperfect specimens of this last; it differs chiefly in the more orbicular lobulate leaves, broader calyx and much shorter more funnel-shaped corolla-tube. Petiole with a very short small sheath. *Corolla-tube* outside, and mouth pubescent. Whole plant smelling like *Geranium Robertianum* (Watt).

B. *Leaves* sessile or base narrowed into a broad winged petiole, margins revolute in vernation (petiole sometimes long and slender in *P. sibirica, involucrata, tibetica,* and *petiolaris*).

* *Scape* normally much longer than the leaves. *Flowers* very numerous in dense heads, or umbellate with very short pedicels, purple. *Bracts* small, short, usually hidden by the flowers, bases not gibbous or produced. *Corolla-tube* usually much exceeding the calyx.

11. **P. denticulata,** *Smith Exot. Bot.* ii. 109, t. 114; sparingly mealy, leaves not fully developed till after flowering surrounded at the base by thick fleshy leafy scales, leaves obovate-spathulate obtuse sharply minutely toothed or subentire, flowers capitate, heads depressed, corolla-tube usually twice as long as the long or short obtuse or acute calyx-teeth, corolla mouth obscurely annulate, lobes obcordate. *Duby in DC. Prodr.* viii. 44; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 17; *Wall. Cat.* 607; *Bot. Reg.* 1842, t. 47; *Bot. Mag.* t. 3959. P. Hoffmeisteri, *Klotzsch in Bot. Reise Pr. Wald.* t. 56.

Temperate Himalaya; from Kashmir to Bhotan, alt. 7–13,000 ft. Khasia Mts., alt. 5000 ft.—Distrib. Affghanistan.

Rootstock stout, short, thick. *Leaves* erect or spreading, midrib broad, never reticulate. *Scape* stout or slender, 4–18 in.; bracts short, unequal, sometimes connate. *Calyx* long or short, base acute or truncate, lobes obtuse or acute. *Corolla*

pale purple, salver-shaped, $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; lobes broad or narrow, mouth obscurely annulate. *Ovary* obovoid or globose, tip rounded. *Capsule* usually oblong, exceeding the calyx, sometimes globose and sunk in it. *Seeds* coarsely granulate.—The commonest Himalayan *Primula*, and very variable.

VAR. *cachemiriana*; leaves produced almost with the flowers, more mealy. P. cachemiriana, *Munro in Garden*, 1879, 535.—Western Himalaya.

VAR. *paucifolia*; leaves fewer longer-petioled, heads fewer-fld., calyx-teeth long narrower nearly equalling the corolla-tube, capsule globose sunk in the calyx (ripening very few seeds).—Kashmir, at Poosiana, alt. 9000 ft., *Clarke.*

12. **P. capitata,** *Hook. Bot. Mag.* t. 4550; usually very mealy, leaves appearing with the flowers obovate-spathulate or oblanceolate obtuse or acute finely toothed usually copiously mealy beneath, fleshy leafy scales few or 0, heads very dense-fld. with the outer flowers deflexed and inner in bud forming a conical crown, flowers deep purple, tube long often wrinkled, limb flat or concave.—*Fl. des Serres,* vi. t. 618. P. globifera, *Griff. Itin. Notes*, 148.

SIKKIM and BHOTAN HIMALAYA, alt. 12–15,000 ft., *Griffith, J. D. H.*

I retain this species as distinct from *P. denticulata* with great hesitation, though it differs much in habit and general appearance, and retains its characters in cultivation.

13. **P. erosa,** *Wall. Cat.* 611; glabrous or puberulous, leaves not mealy fully developed with the flowers membranous obovate-spathulate or oblanceolate toothed or erose reticulate fleshy leafy scales few or 0, flowers umbelled purple mealy, pedicels very short, calyx-lobes long or short, tube twice as long as the calyx, limb flat, mouth hardly annulate. *Regel in Bot. Zeit.* 1853, 333; *Gartenfl.* ii. t. 51. P. denticulata, *var.* erosa, *Duby in DC. Prodr.* viii. 45.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 4500–9500 ft. (not seen in Sikkim).

I suspect Duby to be right in reducing this to a variety of *P. denticulata*, but it differs in habit, and seems to be always recognised as distinct by Himalayan collectors and by cultivators in Europe. The leaves are sometimes 18 inches long.

14. **P. bellidifolia,** *King in Herb. Calc.*; puberulous, fleshy scales few or 0, leaves membranous flaccid elongate oblanceolate or spathulate coarsely shallowly toothed, scape long, bracts minute concealed, flowers small densely capitate, corolla-tube four times longer than the short obtusely lobed mealy calyx, lobes small spreading obcordate.

SIKKIM HIMALAYA; alt. 13,000 ft., *King.*

Rootstock small. *Leaves* 2–4 in., obtuse, tapering into the petiole, pubescent on both surfaces, not wrinkled, nerves faint, teeth irregular. *Scape* 4–8 in., erect, glabrous. *Heads* nearly 1 in. diam.; flowers bluish-purple, quite sessile. *Corolla* glabrous; tube cylindric, $\frac{1}{4}$–$\frac{1}{3}$ in. long; limb not so broad; mouth contracted, annulate. *Stigma* peltate. *Capsule* small, globose.—A very distinct species, with leaves like *Bellis sylvestris*, but quite thin and flaccid; in this respect and in toothing very different from any form of *P. erosa, denticulata*, or *capitata.*

** *Scape* normally much longer than the leaves (except *P. tibetica*). *Flowers* umbelled, rarely capitate, white pink or purple. *Bracts* forming a 1-seriate involucre, gibbous or produced downwards at the base (obscurely in *P. concinna*).

† *Capsule oblong or cylindric, usually longer than the narrow fruiting calyx.*

15. **P. farinosa,** *Linn.*; *Duby in DC. Prodr.* viii. 44; stolons 0, more or less mealy, leaves $\frac{1}{2}$–1 in., sessile or subsessile obovate-spathulate obtuse

entire crenulate or toothed above the middle, bracts small base gibbous, flowers numerous subsessile, corolla-tube exceeding calyx, the limb flat, calyx-lobes 2-fid. *Fl. Danica* i. t. 125; *Sweet Brit. Fl. Gard.* ser. 2, t. 65.

WESTERN TIBET, alt. 12–17,000 ft., *Thomson*, &c.—DISTRIB. Europe, N. and Central Asia, Arctic America.

Rootstock stout. *Leaves* densely rosulate. *Scape* tall and stout for the size of the plant; bracts few, base gibbous; pedicels shorter than the calyx. *Calyx* 5-ribbed, cleft $\frac{1}{3}$–$\frac{1}{2}$ way down; lobes lanceolate, acute, often purple. *Corolla* pale purple, $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; mouth annulate; lobes rather narrow, deeply cleft. *Capsule* oblong. *Seeds* $\frac{1}{50}$ in., angular, pale, minutely papillose.—The Fuegian plant (*P. magellanica*), referred to *P. farinosa* by myself and others, differs in the large granulate seeds.

16. **P. Heydei,** *Watt in Journ. Linn. Soc. Bot. ined.*; stoloniferous, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. sessile lanceolate acuminate coarsely toothed mealy beneath, scape stout, flowers 5–∞ sessile, bracts short base saccate, corolla-tube exceeding the calyx, limb flat.

WESTERN TIBET, alt. 12–14,000 ft., *Thomson*; Taglang, *Heyde*.

A very distinct little species, densely tufted. *Stolons* short, leafy. *Leaves* rosulate, on the stolons subsecund. *Scape* 1–3 in.; inflorescence mealy; bracts gibbous at the base. *Calyx* campanulate, cleft to the middle. *Corolla* pale lilac, $\frac{1}{3}$ in. diam. *Capsule* included. *Seeds* as in *P. farinosa*.

17. **P. concinna,** *Watt in Journ. Linn. Soc. Bot. ined.*; densely tufted, very small, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. oblanceolate acute or obtuse quite entire or subcrenulate mealy beneath, scape short 2–3-fld., pedicels elongated in fruit, calyx deeply cleft equalling the short corolla-tube, corolla-mouth contracted, limb flat, lobes obcordate.

SIKKIM HIMALAYA; on the Tibetan passes, alt. 15–17,000 ft., *J. D. H.*, *Watt*.

Somewhat resembling a reduced state of *P. farinosa* with longer capsules, from which the short corolla-tube and the seeds at once distinguish it. *Tufts* $\frac{1}{2}$ in. high. *Leaves* sometimes narrowed into a short petiole, margins revolute. *Scape* rarely longer than the leaves; bracts gibbous at the base; pedicels sometimes two to four times longer than the scape. *Corolla* $\frac{1}{4}$ in. diam., white or pink. *Capsule* $\frac{1}{6}$ in. long, cylindric-oblong. *Seeds* nearly orbicular, $\frac{1}{50}$ in. diam., a little flattened on one side, quite smooth, pale brown.

18. **P. glabra,** *Klatt in Linnæa* xxxvii. 500; not mealy except the inflorescence, leaves $\frac{1}{2}$–1 in. obovate-spathulate acute or obtuse erose or toothed, scape very slender loosely 3–∞-fld., flowers sessile or shortly pedicelled, bracts short, calyx campanulate, lobes short obtuse equalling the corolla-tube, corolla mouth contracted, limb flat, lobes short 2-fid. *Watt in Journ. Linn. Soc. ined.*

SIKKIM HIMALAYA; alt. 13–15,000 ft., *J. D. H.*, *Clarke*, *Watt*.

A very distinct species. Tufted. *Leaves* rather thin, rigid when dry, often narrowed into a slender or broad petiole; teeth horizontal or recurved. *Scape* 1–5 in.; bracts subulate, $\frac{1}{12}$ in., base gibbous. *Corolla* blue-purple, $\frac{1}{4}$ in. diam. *Capsule* oblong, included. *Seeds* obtusely-angled, $\frac{1}{40}$ in. diam., coarsely papillose.—In foliage and habit this closely resembles *P. pusilla*, but the bracts are very different, and the mouth of the corolla is not bearded.

19. **P. sibirica,** *Jacq. Misc. Austr.* i. 161; not mealy, leaves coriaceous $\frac{1}{2}$–1 in. shortly petioled elliptic ovate or spathulate obtuse entire or crenulate, scape slender 3–6-fld., bracts linear base shortly produced, calyx tubular 5-ribbed, corolla pink, tube shortly exserted, mouth not annulate, limb flat, lobes narrow deeply cleft. *Duby in DC. Prodr.* viii. 43; *Lehm. Monog. Primul.* t. 5; *Bot. Mag.* t. 3167, 3445, 6493.

WESTERN TIBET, ZANSKAR and LAHUL, alt. 13–15,000 ft., *Falconer*, &c.—DISTRIB. Europe, N. America, Arctic America.

Leaves coriaceous, rosulate or suberect and crowded, midrib obscure. *Scape* 3–6 in., bracts erect equalling the pedicels or shorter. *Calyx* $\frac{1}{4}$ in.; lobes short, ovate. *Corolla* $\frac{1}{3}$–$\frac{3}{4}$ in. diam. *Ovary* globose, top rounded, thickened; stigma capitate. *Capsule* cylindric, exserted. *Seeds* $\frac{1}{40}$ in., angular, smooth, pale.

20. **P. involucrata,** *Wall. Cat.* 7107; not mealy, leaves 1–3 in. coriaceous elliptic ovate oblong cordate or orbicular narrowed into a long or short petiole obtuse entire or obscurely crenulate, scape long slender loosely 3–6-fld., bracts linear base much produced often 2-fid, calyx tubular 5-ribbed, corolla white, tube much exserted, mouth annulate, limb flat, lobes broad emarginate. *Duby in DC. Prodr.* viii. 42; *Bot. Reg.* 1846, t. 31; *Regel. Gartenfl.*, 1863, t. 394. P. Munroi, *Lindl. Bot. Reg.* 1833, t. 15.

ALPINE HIMAYLAYA, from Kashmir to Sikkim and Western Tibet, alt. 12–15,000 ft.—DISTRIB. Europe, N. Asia, Arctic America.

Closely allied to *P. sibirica*, but distinguished by the much larger size, broader longer petioled leaves, stouter longer scape, larger white flowers, annulate mouth of the corolla, shorter capsule, and large elliptic or subcuneate seeds acute at one or both ends, $\frac{1}{20}$ in. long. Ovary and stigma as in *P. sibirica*.

21. **P. tibetica,** *Watt in Journ. Linn. Soc. Bot. ined.*; dwarf, tufted, not mealy, leaves petioled $\frac{1}{3}$–$\frac{1}{2}$ in. coriaceous elliptic obtuse or acute quite entire, scape very short 1–5-fld., bracts linear base gibbous, pedicels very long in fruit, calyx tubular, corolla-tube not exserted, mouth annulate, limb flat, lobes deeply cleft.

WESTERN TIBET, north of Kumaon, alt. 15,500 ft., *Strach. & Winterb.* EASTERN TIBET, on the Sikkim frontier, alt. 16–17,000 ft., *J. D. H.*

This closely resembles a dwarf state of *P. sibirica*, to which it stands in the same relation as *P. concinna* does to *P. farinosa*. The capsule is cylindric, much exserted; seeds not seen.

†† *Capsule globose, included in the hemispheric calyx* (*not seen in* P. elliptica).

22. **P. elliptica,** *Royle Ill.* 311, t. 76, f. 2; not mealy, leaves $\frac{1}{2}$–1 in. elliptic ovate or ovate-oblong narrowed into the broad petiole sharply toothed, scape long loosely 3–10-fld., bracts linear base shortly produced, calyx campanulate deeply cleft, corolla purple, tube exserted, mouth not annulate, limb flat, lobes broad deeply cleft. *Duby in DC. Prodr.* viii. 44; P. denticulata, *Wight Ic.* t. 2000. P. spathulacea, *Jacquem. mss.*

WESTERN HIMALAYA; Kashmir and Lahul, alt. 8–12,000 ft., *Falconer*, &c. WESTERN TIBET; Ladak, *Watt*.

Leaves suberect, thinly coricaceous, closely serrated down to the dilated top of the petiole, midrib slender, nerves obscure. *Scape* much exceeding the leaves; bracts equalling or exceeding the short pedicels; flowers nodding. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla-tube* variable; lobes usually acute, sometimes toothed. *Ripe fruit* not seen. A distinct and beautiful plant. The figure in Royle's work is very bad indeed, and but for his specimens the species could not be identified.

23. **P. rosea,** *Royle Ill.* 311, t. 75 f. 1; quite glabrous, not mealy, leaves dense subsessile obovate-oblong or -spathulate or oblanceolate obtuse or acute crenulate or toothed, scape short stout 5–∞-fld., bracts linear-lanceolate or subulate base shortly produced, pedicels short, calyx-lobes ovate acute, corolla rose-red, tube exserted, mouth not annulate, limb flat, lobes bifid. *Duby in DC. Prodr.* viii. 41; *Bot. Mag.* t. 6437; *Regel Gartenfl.* t. 994.

WESTERN HIMALAYA; from Kulu to Kashmir, alt. 10–12,000 ft., *Falconer*, &c. —DISTRIB. Affghanistan.

Often forming large tufts. *Leaves* numerous, variable in length and breadth; margins revolute or flat when flowering, not umbelled, midrib broad, nerves inconspicuous. *Scape* equalling or exceeding the leaves, robust; bracts $\frac{1}{4}$–$\frac{1}{2}$ in.; pedicel very variable. *Calyx* cleft to the middle, tube angular. *Corolla-tube* glabrous within and without, one half to twice as long as the calyx, disk of limb puberulous; lobes variable in width, sometimes toothed. *Seeds* $\frac{1}{25}$ in. long, sharply angled, pale.

VAR. *elegans*; corolla smaller, tube longer, lobes narrower.—P. elegans, *Duby l. c.* 42; *Mem. Prim.* t. i. f. 1. Kashmir, *Jacquemont*; Affghanistan.

*** *Scape* longer than the leaves. *Flowers* many (few in *P. elongata*), umbelled or in superposed whorls. *Bracts* irregular, ovate or subulate, or lanceolate from a broad not gibbous base. (See also *P. petiolaris*, var. 7 *scapigera.*)

† *Ovary globose, top acute not thickened. Capsule globose, included in the calyx.*

24. **P. prolifera,** *Wall. in As. Research.* xiii. 372, t. 3, and in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 18; tall, not mealy, leaves 8–16 in. oblanceolate or elongate obovate-spathulate obtuse quite entire or toothed glabrous or puberulous beneath, scape very tall, flowers in superposed whorls, bracts shorter than the pedicels, calyx short, lobes subulate, corolla yellow tube very long, mouth annulate, limb flat, lobes obcordate crenulate, capsule globose included. *Duby in DC. Prodr.* viii. 34; *Don Prodr.* 81. P. imperialis, *Jungh.*; *Miquel Fl. Ind. Bat.* ii. 1001. Cankrienia chrysantha, *de Vriese in Jahrb. der Maatsch. van Tuinb.* 1850, 30.

KHASIA MTS., alt. 4–6000 ft., *Wallich, &c.*—DISTRIB. Java.

Leaves thin, nerves reticulate, petiole broad. *Scape* 12–18 in., stout, quite erect; flowers in 2–4 distant whorls, pedicels subequal; lower bracts sometimes foliaceous. *Calyx* $\frac{1}{5}$ in. long, 5-ribbed. *Corolla-tube* $\frac{1}{2}$ in. *Capsule* quite glabrous, $\frac{1}{2}$ in. diam., not exserted. *Seeds* rather large, $\frac{1}{25}$ in. diam., coarsely papillose.—I can see no difference between the Khasian and Javan plants. The Japanese *P. japonica*, A. Gray, differs chiefly in the purple flowers. I have not found any specimens of this in Wallich's Herbarium.

25. **P. obtusifolia,** *Royle Ill.* 311, t. 77, f. 1; mealy or not, leaves 2–6 in. membranous elliptic spathulate obovate or ovate acute or obtuse entire crenulate erose or coarsely toothed, base narrowed rounded or cordate, petiole winged, scape stout few- or many-fld., bracts ovate or subulate much shorter than the pedicels often connate below, corolla purple, tube twice as long as the calyx, mouth annulate, limb flat, lobes obcordate. *Duby in DC. Prodr.* viii. 42. (*Herb. Ind. Or. H. f. & T. Prim.* 10.)

EASTERN and WESTERN HIMALAYA; Kunawar, *Royle*; Kumaon, *Herb. Calcutta*; Sikkim, alt. 11–12,000 ft., *J. D. H.*, *Watt*; Bhotan, *Griffith.*

Rootstock stout, clothed with fleshy broad sheathing scales. *Leaves* excessively variable, naked or with yellow meal beneath. *Scape* stout, 6–10 in.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ in., stout in fruit. *Calyx* usually mealy, cupular or broadly campanulate in fruit; lobes triangular and ovate or linear, acute or obtuse. *Corolla* large, bright blue-purple; limb $\frac{2}{3}$–1 in. diam., often puberulous. *Seeds* large, subglobose, $\frac{1}{20}$ in. diam., coarsely papillose.—This resembles states of *P. Stuartii*, but is distinguished by the thin texture of the leaves, acute ovary, and globose capsule sunk in the calyx. The forms with broadly ovate-cordate deeply toothed leaves differ widely in aspect from those with obovate-spathulate ones.

VAR. 1. *Roylei*; leaves obovate-spathulate subentire or erose mealy beneath, tip rounded, umbels few- or many-fld.—Kunawur and Sikkim.

VAR. 2. *Griffithii*, Watt in Journ. Linn. Soc. ined.; leaves ovate-cordate acute deeply toothed.—Bhotan and Sikkim.

26. **P. elongata,** *Watt. in Journ. Linn. Soc. Bot. ined.*; leaves long-petioled 3–5 in. membranous obovate or oblanceolate obtuse crenulate narrowed into a usually long petiole mealy or not beneath, scape tall, flowers few sub-sessile, bracts short subulate, calyx narrow cleft to the middle, teeth lanceolate, corolla yellow glabrous, tube very long, throat funnel-shaped not annulate, lobes rounded obcordate toothed. (*Herb. Ind. Or. H. f. & T. Prim.* 14.)

SIKKIM HIMALAYA; Zemu valley, alt. 12–13,000 ft., *J. D. H.*

A rather slender species, with few yellow flowers remarkable chiefly for the length of the corolla-tube, with rounded toothed lobes, short bracts, and globose ovary with a subacute tip like *P. obtusifolia*, of which it is possibly a form. *Corolla-tube* ¾ of an inch long (including the throat), three times as long as the calyx. *Fruit* not seen.

†† *Ovary rounded and usually thickened at the top. Capsule oblong or cylindric, exceeding the calyx.*

27. **P. Stuartii,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 20; mealy or not, quite glabrous, leaves 4–10 in. coriaceous suberect broadly or narrowly oblanceolate or obovate-spathulate acute or obtuse quite entire crenulate or finely toothed, midrib very broad, petiole broadly membranous below, flowers loosely umbelled, bracts elongate, calyx terete, lobes usually long narrow acute rarely obtuse, corolla yellow or purple, mouth contracted, tube equalling the calyx-throat or long as the tube, limb various, seeds coarsely granulate.

Throughout the SUBALPINE and ALPINE HIMALAYA and TIBET; alt. 12–16,000 ft. —DISTRIB. Affghanistan.

After long study I am unable to draw any specific characters between the many forms of purple and yellow (rarely white) Primulas included under the above character. If there are species amongst them they hybridise so as to defy recognition by description. Each of the following varieties may have its small and great form with narrower or broader, entire and serrated, mealy and green leaves, many or few sessile or pedicelled flowers, more or less deeply-cut calyx, mealy on the outer only, or inner only, or on both surfaces, and a longer or shorter corolla-tube, with very variously formed lobes. The habit of the forms may be seen to depend on dryness or wetness of soil, or the length of herbage amongst which the plant grows, and elevation on the mountains, and many of the forms are no doubt constant and reproduced with much constancy by seed.

VAR. 1. *Stuartii proper*; leaves 5–10 in. narrowly oblanceolate or short and spathulate acute closely sharply toothed rarely entire yellow-mealy beneath, inflorescence more mealy, calyx-teeth linear or lanceolate acute or obtuse, corolla-lobes orbicular and emarginate or broadly obcordate entire or toothed. P. Stuartii, *Wall. l. c.*; *Tent. Fl. Nep.* t. 34; *Cat.* 606 *in part*; *Don Prodr.* 80; *Duby in DC. Prodr.* viii. 41; *Bot. Mag.* t. 4356.—From Sikkim to Kashmir and Tibet

VAR. 2. *purpurea*; leaves as in var. 1 but seldom toothed and oftener broader white- or yellow-mealy beneath, flowers sometimes in two whorls, calyx as in var. 1 but sometimes nearly an inch long linear-oblong and round at the tip, corolla pale or deep purple, lobes obcordate or 2-fid entire, capsule sometimes 1 in. P. purpurea, *Royle Ill.* 311, t. 77, f. 2; *Duby l. c.* 40; *Wall. Cat.* 606 (the Kumaon specimens). P. macrophylla, *Don Prodr.* 80. P. Jæschkiana, *Kerner in Bericht des Naturwiss. Medicin. Vereins Innsbruck, Jahrg.* i. *Heft* 2, 97.

VAR. 3. *Moorcroftiana*; not or very slightly mealy, leaves 2–4 in. oblanceolate acute usually quite entire, scape shorter fewer-flowered, calyx-lobes narrow acuminate, corolla as in var. 1 purple. P. Moorcroftiana, *Wall. Cat.* 4988.—Western Tibet.

Wallich's specimens are miserable, but no doubt referable to the common Western Tibetan form described above; the flowers are sessile in his specimens, as they often are in high alpine forms. Strachey and Winterbottom's *P. Moorcroftiana*, from 16,800 ft. on the Niti Pass, Kumaon, is very dwarf, with leaves white-mealy beneath and sessile flowers.

VAR. 4. *macrocarpa*; leaves mealy beneath 2–5 in. oblanceolate obtuse or acute, calyx very large $\frac{1}{2}$–$\frac{3}{4}$ in. long divided nearly to the base into linear-oblong obtuse leathery lobes, capsule 1 in.—Sikkim, alt. 15–17,000 ft., *J. D. H.*

VAR. 5. *leneariloba*; lobes of corolla narrow deeply divided into two spreading linear lobes.—Tibet N. of Sikkim, *J. D. H.* I have seen flowers only, procured by my collectors. Considering the range of variation in the corolla-lobes of this and other species, I do not doubt this being an alpine state of *Stuartii* allied to var. *purpurea*.

28. **P. sikkimensis,** *Hook. f. in Bot. Mag.* t. 4597; glabrous, leaves 6–14 in. membranous not mealy oblong-obovate or -spathulate obtuse, margins sharply toothed decurrent on a long broadly winged and often toothed petiole, scape very tall, bracts very short subulate, flowers very many yellow, pedicels slender, calyx strongly 5-angled and 5-ribbed, teeth subulate, corolla funnel-shaped, tube not annulate longer than the calyx, limb concave, lobes rounded emarginate.

SIKKIM HIMALAYA; in wet places, alt. 11–15,000 ft., *J. D. H.*, &c.

Rootstock as thick as the thumb, very short. *Leaves* often 2 in. diam., midrib not broad, nerves many slender. *Scape* often 2 ft. and as thick as a goose-quill, inflorescence sometimes mealy; bracts $\frac{1}{10}$–$\frac{1}{2}$ in.; flowers 6–30, nodding; pedicels slender, $\frac{1}{2}$–4 in. *Calyx* $\frac{1}{4}$–$\frac{1}{3}$ in., teeth recurved. *Corolla* $\frac{2}{3}$ in. long and $\frac{1}{2}$–$\frac{2}{3}$ in. broad, blue-green when dry, quite glabrous within and without. *Ovary* globose, crown rounded not thickened. *Capsule* oblong-cylindric, rather longer than the calyx, teeth short. *Seeds* coarsely granulate.—The tallest described *Primula*, more resembling the Cowslip than any other Indian one; odour faint, sweet.

**** *Scape* much longer than the leaves. *Flowers* 1–5. *Bracts* very few, slender or 0, base not gibbous or produced.

† *Tube of corolla cylindric or narrowly funnel-shaped, mouth glabrous or puberulous.*

29. **P. Kingii,** *Watt mss.* glabrous, not mealy, leaves crowded 2–3 in. elliptic-lanceolate acute quite entire or obscurely crenulate, midrib stout, base sheathing broadly membranous, scape tall 4–5-fld., bracts subulate from a broad base, pedicels short puberulous, calyx narrowly subcampanulate 5-cleft above or to the middle, corolla red-purple broadly funnel-shaped puberulous very shortly 5-lobed, limb concave, lobes retuse glabrous within.

SIKKIM HIMALAYA; at Na-tong (*Herb. Calcutta*).

A very distinct species, with the habit of *P. Dickieana*, and the funnel-shaped shortly lobed corolla of *sikkimensis*. *Leaves* rather thick in texture, spreading, pale when dry. *Scape* 6–10 in., slender; bracts very unequal. *Calyx* $\frac{1}{3}$ in., obtusely angled. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., claret-coloured, glabrous within. *Ovary* with a rounded 5-lobed crown. *Fruit* not seen.

30. **P. Dickieana,** *Watt in Journ. Linn. Soc. Bot. ined.*; quite glabrous, not mealy, leaves elliptic-obovate or oblanceolate acute quite entire or serrate sessile or petiole elongate and narrowly membranous below, flowers 2–6 large yellow sessile or shortly pedicelled, bracts linear or subulate, calyx campanulate 5-cleft, lobes ovate oblong or lanceolate obtuse or acute, corolla yellow, tube twice as long as the calyx hairy within, mouth not annulate, lobes obcordate, tube and disk of flat limb pubescent, ovary with a thickened obtuse tip. (*Herb. Ind. Or. H. f. & T. Prim.* 13.)

SIKKIM HIMALAYA; Lachen, on open banks, alt. 10–13,000 ft., *J. D. H.*

This, though in many respects approaching small states of *P. Stuartii*, seems quite distinct, in the total absence of scent, small leaves, few flowers, and hairy tube, and pubescent disk of the corolla. The leaves too are, if not quite entire, distantly and distinctly serrate, not toothed or crenate. It is a beautiful plant. *Fruit* not seen.

31. **P. Elwesiana,** *King in Herb. Calc.*; not mealy, leaves 2–3 in. oblanceolate subacute quite entire glabrescent coriaceous, nerves obscure, scape and solitary inclined very large purple flower softly pubescent, bract 0, calyx short 5-partite, segments ovate-lanceolate, corolla-tube funnel-shaped ¾ in. long, lobes obovate-oblong crenate spreading and recurved.

SIKKIM HIMALAYA; alt. about 12,000 ft., *King.*

Rootstock very stout, with broad fleshy leafy scales. *Leaves* narrowed into a broadly winged puberulous petiole. *Scape* 6–7 in., stout. *Flower* 1 in. long and wide, dark purple. *Calyx* ⅓ in. long. *Corolla* pubescent all over. *Stamens* linear, on the mouth of the tube. *Ovary* very small, conical, acute; style filiform, stigma minute truncate.—A very remarkable and beautiful species.

32. **P. tenella,** *King in Herb. Calc.*; leaves small (⅓ in.) petioled obovate or trapeziform toothed above the middle mealy, scape filiform and large solitary erect bluish-white flower glabrous, bract very small, calyx 5-cleft to the middle, lobes obtuse, corolla-tube long slender, throat broadly funnel-shaped, lobes 5 very broadly and deeply obcordate.

E. TIBET; Chumbi valley, between Sikkim and Bhotan, at Phari, alt. about 13,000 ft., *King.*

Whole plant 2–2½ in. high, glabrous. *Rootstock* stout. *Leaves* many, mealy all over, especially beneath, subacute, cuneate and entire below the middle. *Scape* very slender; bract close to and shorter than the calyx. *Corolla-tube* ½ in., limb ¾ in. diam. *Stamens* near the base of the tube. *Stigma* included, large, peltately capitate.

†† *Mouth of salver-shaped corolla densely woolly.*

33. **P. pusilla,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 22; *Cat.* 609; *Tent. Fl. Nep.* t. 32; densely tufted, hoary, leaves ½–1 in. spathulate or oblanceolate pinnatifidly toothed, scape very slender 1–4-fld., bracts few lanceolate, flowers sessile, calyx hoary, tube short terete, lobes oblong obtuse or acute equalling the funnel-shaped corolla-tube, corolla-lobes longer than the tube, lobules spreading, capsule included. *Duby in DC. Prodr.* viii. 42; *Mem. Prim.* t. 1, f. 2. P. humilis, *Steudel Nomencl.* ed. ii. 395. Androsace primuloides, *Don Prodr.* 81. A. primulina, *Spreng. Syst. Veg. Cur. Post.* 56.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich*; Sikkim, alt. 13–16,000 ft., *J. D. H.*, &c.

Leaves in dense rosettes, 1–2 in. diam., petioled, margins and teeth recurved, hoary above; bracts sometimes leafy and toothed, glandular as is the calyx and corolla-tube. *Scape* 2–3 in. *Corolla* ¼–⅓ in. diam.; lobules oblong, spreading.

††† *Corolla broadly funnel-shaped or subcampanulate, mouth glabrous.*

34. **P. sapphirina,** *Hook. f. & T. Herb. Ind. Or. Prim.* 32; very small, glabrous or hoary, leaves ⅙–¼ in. obovate-spathulate obtuse pinnatifidly toothed, scape filiform 1–4-fld., bracts ovate-oblong, flowers sessile nodding, calyx-tube short terete equalling the obtuse lobes, corolla hoary, lobes very short 2-fid, capsule included.

SIKKIM HIMALAYA, alt. 13–15,000 ft., *J. D. H.*, &c.

Rosettes ¼–½ in. diam. *Leaves* with scattered white hairs above. *Scape* 1–2 in. *Corolla* ¼ in. diam., bright or pale blue.

35. **P. uniflora,** *Klatt in Linnæa* xxxvii. 500; not mealy, leaves petioled ½ in. orbicular or broadly ovate pinnatifidly crenate, scape very slender 1–2-fld., bracts very minute, flowers sessile very large nodding, calyx 5-partite segments quadrate, corolla broadly funnel-shaped, lobes shallow coarsely toothed.

SIKKIM HIMALAYA; Kankola Pass, alt. 15,000 ft., *J. D. H.*

This and the following are very singular species, the corolla being larger than the whole rosette of leaves, and calyx quite peculiar.—*Leaves* few, petiole puberulous, equalling or exceeding the blade. *Scapes* 1–3, 2–5 in. *Flower* 1 in. diam., with occasionally a very imperfect apetalous one. *Calyx* puberulous; segments nearly $\frac{1}{4}$ in. long, truncate, tip entire or toothed. *Corolla* pale lilac, tube $\frac{1}{5}$ in., limb $\frac{2}{3}$ in. long and broader, lobes very shallow and unequally toothed. *Stamens* near the bottom of the tube. *Ovary* globose.

36. **P. soldanelloides,** *Watt in Journ. Linn. Soc. Bot. ined.*; quite glabrous, not mealy, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long-petioled ovate runcinate-pinnatifid half-way to the midrib, scape capillary 1-fld, bract 0, flower large nodding, calyx cleft half-way, lobes oblong ovate or obtuse, corolla broadly funnel-shaped, lobes shallow coarsely toothed.

SIKKIM HIMALAYA; Kankola Pass, *J. D. H.*; Patangla (*Herb. Calcutta*).

A smaller plant than *P. uniflora*, quite glabrous, with a very different calyx, but similar corolla, which is white. *Calyx-lobes* entire or obscurely toothed. *Ovary* globose.

***** Minute species (except *P. petiolaris*). *Scape* 0, or much shorter than the leaves (sometimes elongate in *P. petiolaris*). *Bracts* subulate, at the bases of the leaves or on the very short scape. (See also *P. concinna* and *P. tibetica.*)

37. **P. petiolaris,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 22; *Tent. Fl. Nep.* t. 31; *Cat.* 603; glabrous or puberulous, mealy or not, leaves 2–10 in. rugose densely rosulate membranous erose jagged toothed or crenulate of two forms in the same or different plants, some broadly or narrowly obovate-spathulate sessile or narrowed into a broadly winged petiole, others elliptic ovate or cordate on long slender petioles, pedicels long or short, calyx-teeth acute, corolla pale purple or white or pink, tube funnel-shaped above much longer than the calyx, mouth not annulate, limb flat, lobes rounded entire emarginate 2-fid or sharply toothed, ovary globose, tip acute, stigma capitate, capsule globose sunk in the broad calyx-tube, seeds large subglobose black papillose. *Duby in DC. Prodr.* viii. 37. P. tridentata, *Don Prodr.* 77. P. sessilis, *Royle mss.*

TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 4–12,000, abundant. Fl. autumn and winter.

A most variable plant. The following forms pass into one another in all ways:—

VAR. 1. *petiolaris proper*; not mealy, leaves mostly elliptic, blade 1–3 in., petiole 2–6 in., scape 0, corolla large, lobes broad 2-fid or many-toothed.

VAR. 2. *nana*; slightly mealy or not, leaves all or mostly obovate-spathulate sessile or shortly petioled, corolla smaller, lobes obcordate entire or toothed. P. nana, *Wall. l. c.* 23; *Cat.* 612; *Griff. Ic. Pl. Asiat.* t. 485, f. 2 (*Primula*).

VAR. 3. *Stracheyi*; not mealy, leaves all obovate-spathulate erose, flowers very numerous, scape 0, calyx small, corolla $\frac{3}{4}$ in. diam., tube long, lobes narrower obcordate entire.—Kumaon, at Namil, alt. 8000 ft., *Strach. & Winterb.* (*Prim.* 12).

VAR. 4. *sulphurea*; leaves 2 in. sessile obovate clothed with yellow meal beneath finely toothed, corolla small $\frac{1}{2}$ in. diam., tube not twice the length of the small calyx, lobes entire or lacerate.—Kumaon, at Suring, alt. 4500 ft., *Strach. & Winterb.* (*Prim.* 10).

VAR. 5. *pulverulenta*; covered all but the corolla with yellow meal, leaves all obovate-spathulate and irregularly toothed, flowers very numerous and large, corolla 1–1$\frac{1}{4}$ in. broad, tube twice as long as the calyx-lobes coarsely toothed.—Kumaon, at Pindaree, alt. 10–12,000 ft.; *Edgeworth*, &c. (*Strach. & Winterb. Prim.* 9).

VAR. 6. *Edgeworthii*; buds only mealy, leaves very large 3–4 in. without the petiole which is often as long ovate or elliptic base truncate acute or cordate, margin irregularly coarsely toothed or lobulate with toothed lobules, pedicels stout, calyx

cupular with broad short lobes.—Garwhal, at Tungnath, alt. 8–900 ft., *Edgeworth*; Simla, alt. 7–10,000 ft., *Thomsen*; Kumaon, at the Madhari Pass, alt. 8000 ft., *Strach. & Winterb.* (*Prim.* 8).

VAR. 7. *scapigera*; leaves as in var. 1, scape very stout equalling or exceeding the leaves, bracts short subulate from a broad base, pedicels 1–2 in. stout with sometimes a few small leaves intermixed.—Bhotan, *Griffith*; Sikkim, alt. 8–12,000 ft., *J. D. H.*

38. **P. minutissima,** *Jacquem. mss. in DC. Prodr.* viii. 42; very small, densely tufted, stoloniferous, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. spathulate lanceolate or oblanceolate acuminate acute or obtuse toothed above glabrous or puberulous mealy beneath, scape sunk amongst the leaves 1–3-fld., flowers sessile 1–2-bracteate, calyx cleft to the middle, tube terete, lobes oblong or lanceolate much shorter than the long corolla-tube, corolla very large for the plant, lobes obcordate. *Duby Mem. Prim.* t. 1, f. 3. P. Saundersiana, *Herb. Royle.* P. Stracheyi, *Hook. f.*; *Munro in Garden*, 1879, 535.

ALPINE HIMALAYA, alt. 12–16,000 ft.; from Kashmir to Kumaon, alt. 12–15,000 ft.

Forming large patches of rosettes each $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Leaves* densely crowded, dark green, teeth not recurved. *Calyx* glabrous, lobes very variable. *Corolla* bright purple, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., tube glabrous, lobes bifid, lobules rounded. *Ovary* globose, tip subacute; stigma capitate.—This may be a reduced form of *P. Heydei.*

VAR. *spathulata*; leaves larger spathulate-obovate crenate, tip rounded. *Corolla* $\frac{2}{3}$ in. diam. Sikkim, alt. 13,000 ft., *J. D. H.*

39. **P. reptans,** *Hook. f.*; minute, not mealy, tufted, minutely puberulous, stem creeping, leaves $\frac{1}{8}$–$\frac{1}{4}$ in. long including the petiole orbicular cleft one-third way down into lobules with recurved margins, flowers solitary shortly pedicelled erect much larger than the foliage, calyx small terete cleft to the middle, lobes oblong obtuse one-fourth the length of the corolla-tube which is long with a narrowly funnel-shaped mouth and spreading deeply 2-fid lobes.

WESTERN HIMALAYA; *Falconer*; Kashmir, Burjila, alt. 14,500 ft., *Clarke.*

The creeping stem, minute rounded leaves $\frac{1}{16}$–$\frac{1}{8}$ in. diam., suddenly contracted into the slender petiole, palmately lobulate except at the very base, and the large flowers, well characterise this little species. *Corolla* pale purple, $\frac{1}{2}$ in. diam., tube $\frac{1}{3}$ in. long. *Ovary* globose, tip acute; stigma globose.

40. **P. Hookeri,** *Watt in Journ. Linn. Soc. Bot. ined.*; tufted, glabrous, not mealy, leaves $\frac{1}{2}$–1 in. usually sessile narrowly obovate-oblong or -spathulate tip rounded margin sharply toothed and recurved, midrib very broad, outer reduced to large sheaths, scape 0 or very short, flowers 1–3 very shortly pedicelled, calyx cupular or campanulate glandular with 5 very short broad acute teeth, corolla-tube wide cylindric twice as long as the calyx, lobes short 2-fid rounded. *Herb. Ind. Or. H. f. & T. Prim.* 25.

SIKKIM HIMALAYA; Lachen, alt. 12,000 ft., *J. D. H.*

A very distinct species, differing in the calyx from any of the group.—*Roots* stout, fleshy. *Leaves* dark green, rather fleshy, rarely produced into a petiole, teeth often recurved, outer reduced to oblong fleshy scales toothed at the tip. *Corolla* white, mouth without a thickened ring; lobes about as long as the tube. *Ovary* globose, tip acute; stigma globose.

41. **P. muscoides,** *Hook. f.*; minute, glabrous, not mealy, densely tufted, leaves $\frac{1}{16}$–$\frac{1}{10}$ in. sessile obovate-oblong or subspathulate dilated at the base margins recurved coarsely toothed or oblong and toothed at the tip only, midrib very broad, flowers solitary subsessile with 2 broad ovate bracts, calyx short

cleft nearly to the base, lobes oblong-lanceolate, corolla-tube twice as long as the calyx cylindric, lobes short. *Herb. Ind. Or. H. f. & T. Prim.* 23; *Watt in Journ. Linn. Soc. ined.*

SIKKIM HIMALAYA; Kankola Pass, alt. 15,000 ft., *J. D. H.*

Much the smallest species of the genus, forming moss-like tufts interlaced with the roots and stems of other small plants. It is most allied to *P. Hookeri. Ovary* globose, tip acute, stigma capitate.

VAR.? *tenuiloba*; leaves with short petioles, corolla-tube narrower slightly hairy, lobes very narrow deeply cleft with narrow lobules.—Sikkim Himalaya; Yeumtong, alt. 14,000 ft., *J. D. H.*; (*Herb. Ind. Or. H. f. & T. Prim.* 22). I have very few specimens of this, which may prove a distinct species.

42. **P. Stirtoniana,** *Watt in Journ. Linn. Soc. Bot. ined.*; not mealy, glandularly puberulous, tufted, leaves ½ in. obovate-spathulate tip rounded margins flat sharply closely toothed, midrib slender, scape 0, flowers solitary on slender pedicels sunk amongst the leaves, calyx cleft to the middle, teeth lanceolate acute entire or toothed, corolla-tube twice as long as the calyx, mouth funnel-shaped, lobes deeply cleft entire or crenate.

SIKKIM HIMALAYA; Kanglanamo Pass, alt. 14–16,000 ft., *Watt.*

In size this much resembles *P. Hookeri*, but it differs entirely in the shape of the leaves, calyx, and corolla tube. *Bracts* 0 or 1–2 very slender ones on the pedicel. *Corolla* bright purple, ½–⅔ in. diam., glabrous. *Ovary* obovoid, tip thickened retuse; stigma capitate.

C. *Leaves* narrowed into a broad winged petiole, complicate in vernation. *Scapes* many, longer than the leaves. *Flowers* in superimposed whorls. *Bracts* few, leafy, toothed.

43. **P. floribunda,** *Wall. Tent. Fl. Nep.* t. 33; *Cat.* 1825; glandular-pubescent, leaves elliptic acute or obtuse narrowed into a broad winged petiole coarsely irregularly toothed, whorls 2–8, pedicels very unequal, bracts ovate or elliptic, acuminate toothed, calyx campanulate, lobes acute, corolla yellow, tube long, limb small, lobes obcordate. *Duby in DC. Prodr.* viii. 35. P. obovata, *Wall. Cat.* 610. Androsace obovata, *Wall. mss.*

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 2500–6500 ft.—DISTRIB. Affghanistan.

Leaves 2–4 in. *Scapes* numerous, stout, 4–8 in.; pedicels ½–1 in.; bracts shorter. *Calyx* glandular, hemispheric in fruit, cleft to the middle; lobes ovate, acute. *Corolla-tube* ¼–⅓ in., pubescent, throat more or less dilated, mouth annulate; limb ¼–½ in. diam. *Ovary* globose, top rounded; stigma globose. *Capsule* globose, included in the hemispheric calyx. *Seeds* $\frac{1}{50}$ in., black, angled, minutely papillose.—Closely allied to the Arabian and Abyssinian *P. verticillata* and *P. simensis.*

2. ANDROSACE, *Linn.*

Perennial rarely annual low herbs. *Leaves* various, rosulate or imbricate on the branches. *Flowers* small, white or red. *Calyx* 5-lobed or -partite. *Corolla* salver-shaped with a very short tube, or funnel-shaped, limb 5-lobed, mouth annulate or with folds opposite the lobes. *Stamens* 5, anthers subsessile, included in the tube, obtuse. *Ovary* globose, style short. *Capsule* ovoid or globose, 5-valved. *Seeds* 2, rarely more, angular or subglobose, embryo transverse.—Species about 40, chiefly mountain plants, all of N. temperate or Arctic regions.

* Scapes numerous. Leaves all radical. Stolons 0, except in *A. geraniifolia.*

† *Leaves long-petioled, rounded-cordate, lobulate and crenate.*

1. **A. saxifragæfolia,** *Bunge Enum. Pl. Chin. Bor.* 53; annual, glandular-pubescent, leaves rounded-cordate crenate-toothed, blade about as long as the petiole, calyx deeply 5-cleft, segments elliptic-acuminate stellately spreading in fruit. *Duby in DC. Prodr.* viii. 53. A rotundifolia, *Wall. Cat.* 613; *Smith Exot. Bot.* t. 113; *DC. l. c.* 54 (*not of Hardwicke*). A. patens, *Wright in Mem. Amer. Acad. Sc. ser.* 2, vi. 401. ? A. carnosula, *Duby in DC. l. c.* 54.

Gangetic Plain, from Calcutta to the Punjab, and ascending the Himalayas to 4000 ft.—Distrib. N. E. China, Japan, Loochoo Islands.

The only annual Indian species. *Leaves* $\frac{1}{4}$–$\frac{2}{3}$ in. diam. *Scapes* many, twice as long as the leaves; invol. bracts. $\frac{1}{8}$ in.; pedicels $\frac{1}{4}$–$1\frac{1}{2}$ in., very unequal. *Calyx* fruiting $\frac{1}{6}$–$\frac{1}{3}$ in. diam. *Corolla* narrower or broader than the calyx. *Seeds* minute, subglobose, deeply pitted.—A plant confused with Hardwicke's *A. rotundifolia* by Wallich, Smith and others, and with a third species by Roemer and Schultes (see Obs. in Roxb. Fl. Ind. ed. Wall. & Carey, ii. 14).

2. **A. rotundifolia,** *Hardwicke in As. Research.* vi. 350; perennial, glandular-pubescent or villous, leaves rounded-cordate lobulate the lobules usually 3-crenate, blade usually shorter than the petiole, bracts lanceolate or obovate crenate sessile or petioled entire or sharply toothed, calyx cleft to the middle, segments ovate recurved in fruit. *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey,* ii. 14, *excl. Obs.* A. incisa, *Wall. l. c.* 16; *Cat.* 616; *Duby in DC. Prodr.* viii. 54. A. parviflora, *Jacquem. mss. in DC. l. c.* 54; *Mem. Prim.* t. 3, f. 4. A. elegans, *Jacquem. mss. l. c.* 55.

Temperate Himalaya, alt. 5–11,000 ft., from Kashmir to Kumaon, and in Western Tibet.

Very variable. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. diam., petiole 1–4 in.; lobes very shallow, sometimes the sinus is not deeper than that of the crenatures. *Scapes* few or many, 1–6 in.; invol. bracts short or long, broad or narrow, sometimes $\frac{2}{3}$ in. long and deeply 5-cleft at the broad end. *Calyx*, fruiting $\frac{1}{4}$–$\frac{1}{2}$ in. diam., sometimes much enlarged, nearly 1 in. diam. and acutely toothed or 3-fid at the tip. *Corolla* usually much larger than the calyx, but when the latter is enlarged it becomes very small and even minute. *Capsule* much smaller than the calyx. *Seeds* minute, rounded, granulate.—I cannot doubt this being Hardwicke's *A. rotundifolia*, found by him on "the most elevated mountains of Shreenugur," and described as having toothed invol. leaves. Wallich referred *A. saxifragæfolia* to Hardwicke's *rotundifolia*, and re-describes the latter as *A. incisa*.

Var. 1. *rotundifolia proper*; softly pubescent or villous, 3–5 in. high, lobules of leaf rounded entire or crenate rarely acutely toothed, corolla rarely exceeding the entire calyx-lobes.—Kumaon to Kashmir, alt. 3–9000 ft.

Var. 2. *macrocalyx*, Watt in Journ. Linn. Soc. ined.; habit, pubescence and leaves of var. 1, but calyx-lobes much larger acutely toothed.—Kashmir, alt. 5–9500 ft.

Var. 3. *glandulosa*; usually 5–12 in. high, glandular pubescent, petioles and scapes more slender, lobules of leaves rounded entire truncate or crenate rarely acutely toothed, corolla usually much larger than the entire calyx-lobes.—Drier ranges of Lahul and Kashmir; abundant in Western Tibet, alt. 7–12,000 ft.—A form affecting high dry regions.

Var. 4. *Stracheyi*, Watt l. c.; glandular-pubescent or glabrescent, 4–6 in. high, scapes and petioles slender, lobules of leaf entire or crenate, calyx in flower large campanulate, lobes quite entire much exceeding the calyx.—Garwhal, at Bampa, alt. 11,000 ft., *Str. & Winterb.* Kunawur, alt. 8–11,000 ft., *Munro, Thomson, Brandis.*

VAR. 5. *Thomsoni*, Watt l. c.; much smaller, glandular-puberulous, leaves small, lobules acutely toothed, petioles filiform, flowers small, corolla exceeding the entire calyx lobes.—Western Tibet; Dras river, *Thomson*; Iskardo, alt. 9000 ft., and Barji la, alt. 11,000 ft., *Clarke.*

3. **A. geraniifolia,** *Watt in Journ. Linn. Soc. ined.*; perennial, stoloniferous, laxly villous with soft spreading hairs, leaves rounded-cordate 7-lobed to the middle, lobes 3-lobulate, petiole much longer than the blade, bracts very small lanceolate acuminate quite entire, calyx campanulate 5-cleft above the middle, corolla exceeding the calyx.

KUMAON; at Dwali, alt. 8200 ft., *Strach. & Winterb.* SIKKIM in damp woods at Lachen, alt. 9–10,000 ft., *J. D. H.*

Stolons a foot long, very slender. *Leaves* 1–2 in. broad, petiole 2–6 in. *Scapes* much longer than the leaves; invol. bracts $\frac{1}{8}$ in. *Calyx* small, broadly campanulate, $\frac{1}{10}$–$\frac{1}{8}$ in. diam.; lobes broad or narrow, recurved.

†† *Leaves lanceolate elliptic or spathulate, densely rosulate.*

4. **A. septentrionalis,** *Linn.*; *Boiss. Fl. Orient.* iii. 17; glabrous, leaves small densely rosulate sessile oblanceolate acute or obtuse, scapes rigid, invol. bracts minute subulate, calyx turbinate 5-toothed, corolla very small. *Duby in DC. Prodr.* viii. 52; *Lamk. Ill.* t. 98, f. 2; *Fl. Dan.* t. 7; *Bot. Mag.* t. 2021; *Nees Ic. Gen. Fl. Germ.* v. t. 6; *Reichb. Ic. Fl. Germ.* xvii. t. 1110.

WESTERN TIBET; *Falconer*; Karakoram and Deosar, alt. 12–14,000 ft., *Clarke.*—DISTRIB. Mid-Europe, Caucasus, N. Asia, Arctic America.

Leaves in Tibetan specimens $\frac{1}{4}$–$\frac{1}{2}$ in., coriaceous, densely packed, quite entire or obscurely toothed. *Scapes* many, 4–6 in., one usually much stouter than the rest and rather longer; invol. bracts $\frac{1}{10}$–$\frac{1}{8}$ in.; pedicels 1–2 in., very unequal. *Flowering calyx* $\frac{1}{12}$–$\frac{1}{10}$ in. diam., fruiting about $\frac{1}{8}$ in., teeth acute. *Corolla* very small. *Seeds* small, angular, granulate.

5. **A. Aizoon,** *Duby in DC. Prodr.* viii. 50; perennial, inflorescence glandular-pubescent, leaves densely rosulate sessile cartilaginous spathulate cuspidate ciliolate, scapes very long, invol. bracts small lanceolate, calyx between hemispheric and turbinate cleft to the middle, corolla small. *Dcne in Jacquem. Voy. Bot.* 141, t. 145.

KASHMIR and WESTERN TIBET; alt. 8–11,000 ft., *Jacquemont, Falconer*, &c.

Leaves $\frac{1}{4}$–1 in., very numerous and most densely rosulate, margins thickened when dry. *Scapes* $\frac{1}{2}$–2 ft.; invol. bracts $\frac{1}{10}$ in., ovate; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in., very unequal. *Calyx* turbinate; lobes oblong, obtuse. *Corolla-lobes* 2-fid with 2-fid appendages. *Capsule* with 2-fid valves. *Seeds* large, angular, rough.

** Scapes solitary; flowers umbelled, except in 1-flowered varieties of *A. villosa.*

† *Leaves minute, cartilaginous, glabrous except the strongly ciliate margins.*

6. **A. sempervivoides,** *Jacquem. in DC. Prodr.* viii. 50; small, stoloniferous, leaves densely rosulate obovate-spathulate apiculate ciliate cartilaginous, scape solitary, umbels glandular-pubescent, pedicels short, calyx cleft to the middle, lobes obtuse, corolla-lobes obovate, tips rounded. *Duby Mem. Prim.* t. 3, f. 2.

WESTERN TIBET; *Jacquemont, Falconer.* Sind Valley, KASHMIR, alt. 11,000 ft., *Clarke.*—DISTRIB. Affghanistan (a form with longer narrow leaves).

Rosettes $\frac{1}{2}$ in. diam., subglobose. *Stolons* short, 1–1$\frac{1}{2}$ in., stout, naked. *Leaves* glabrous on both surfaces, $\frac{1}{4}$–$\frac{1}{3}$ in., margins translucent when dry. *Scape* 1–3 in.,

stout; bracts linear-oblong; pedicels short, stout. *Calyx* broadly turbinate, lobes erect in fruit. *Capsule* 1–2-seeded. *Seeds* large, oblong, plano-convex.

7. **A. microphylla,** *Hook. f.*; densely tufted, stolons 0 or obscure, leaves minute densely imbricate on the short crowded branches sessile obovate concave incurved cartilaginous ciliate, scapes very short and small, umbels glandular-pubescent, calyx cleft to the middle, lobes obtuse, corolla-lobes obovate tips rounded mouth annulate. A. globifera, *Klatt in Linnæa*, xxxii. 292 (*not of Duby*). A. villosa, *Herb. Ind. Or. H f. & T., not of Linn.*

KASHMIR; inner ranges; Brazil and Tilail, alt. 12–13,000 ft., *Thomson, Clarke.* WESTERN TIBET, *Falconer.*

Stems 1–6 in., sometimes rigid, with subremote rosettes. *Leaves* $\frac{1}{12}$–$\frac{1}{8}$ in., obtuse or mucronate or cuspidate. *Scapes* $\frac{1}{4}$–1 in., 3–6-fld. *Flowers* and seeds as in *A. sempervivoides*, but ring at mouth of corolla not produced. *Seeds* 2, oblong, angular.

†† *Leaves large or small, pubescent villous or silky.*

8. **A. sarmentosa,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 14; *Pl. As. Rar.* iii. t. 206; *Cat.* 614, *and* 615 *in part*; pubescent villous or silky, stolons leafless except at the nodes, leaves sessile or petioled elliptic-lanceolate or oblanceolate subacute, bracts various entire silky, umbels lax or dense, calyx cleft half-way, lobes obtuse, corolla-throat obscurely annulate. *Duby in DC. Prodr.* viii. 49; *Bot. Mag.* t. 6210.

TEMPERATE and SUB-ALPINE HIMALAYA, from Sikkim to Kashmir.

A very variable plant in size, habit, clothing, length, and shape of invol. leaves, and number, length, and stoutness of pedicels.—*Calyx* hemispheric. *Corolla* twice as broad, pale rose-purple with a yellowish eye, lobes broadly obovate, tips rounded; throat with a raised ring. *Capsule* broadly oblong, valves entire. *Seeds* few or many, oblong or subglobose, granulate. The following varieties have no precise limits.

VAR. 1. *Watkinsi*; laxly hairy or silky, scapes and stolons stout, leaves $\frac{1}{2}$–1 in., lanceolate or oblanceolate subsessile or sessile, pedicels $\frac{1}{2}$–1$\frac{1}{2}$ in. much longer than the invol. bracts.—Nipal.

VAR. 2. *grandifolia*; pubescent or laxly hairy, stolons 0, scape stout, leaves very large sometimes 1 in. diam. elliptic or lanceolate narrowed into the long or short petiole, bracts very small. A. foliosa, *Klatt in Linnæa* xxxii. 293, *not of Duby.*—Sikkim, at Tungu, alt. 13–14,000 ft., *J. D. H.*

VAR. 3. *primuloides*; silkily villous, leaves as in var. 1 but often narrowed into a petiole, and stolons (often absent) and scapes more slender. A. primuloides, *Duby l. c.* 30; *Mem. Prim.* t. 3, f. 3.—Kumaon, alt. 12,000 ft., *Edgeworth.* Kashmir, Zanskar, and Lahul, alt. 8–10,000 ft.

VAR. 4. *foliosa*; leaves long petioled elliptic 1 in. diam., stolons 0?, scape slender, bracts small linear. A. foliosa, *Duby in Jacquem. Voy. Bot.* 142, t. 146; *DC. l. c.* 49; Banehal, *Jacquemont.*

9. **A. lanuginosa,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 15; *Cat. n.* 615 and 614 *in part*; pubescent or silkily villous, stolon-like branches long leafy throughout and with scattered rosettes, leaves lanceolate acute or acuminate, scape solitary, invol. bracts various entire silky, umbels lax or dense, calyx cleft half-way, lobes obtuse, corolla-throat obscurely annulate. *Bot. Mag.* t. 4005.

WESTERN HIMALAYA; alt. 7–10,000 ft., from Kumaon to Kashmir.

Very similar in calyx and corolla to *A. sarmentosa*, and as variable in stature and clothing, but in habit entirely different, the ascending branches 1–10 in. long only resemble stolons, and never root, the leaves are smaller, always sessile and much more densely silky in the ordinary state of the plant, the flowers are smaller. *Capsule* 4–6-

seeded. *Seeds* angular, granulate.—In Wallich's Herbarium the ticket of this has been inadvertently attached to a sheet of *A. sarmentosa*.

VAR. 1. *typica*, densely clothed with white silky hairs, stems and branches elongate, umbels dense-fld., pedicels short.—Throughout the Western Himalaya.

VAR. 2. *glabrior*, Wall.; more slender, sparingly villous or silky, umbels loose, pedicels ½–1 in. slender.—Kumaon to Sirmore.

10. **A. villosa,** *Linn.*; *Boiss. Fl. Orient.* iii. 13; stoloniferous, densely villous, leaves in small globose rosettes sessile lanceolate or spathulate, scapes solitary, invol. leaves usually equalling the pedicels, calyx cleft half-way, lobes obtuse, corolla-lobes obovate, tips rounded, mouth with a conical erect tubular swelling. *Duby in DC. Prodr.* viii. 50; *Jacq. Coll.* i. t. 12; *Reichb. Ic. Crit.* iii. t. 248, vi. t. 580; *Ic. Fl. Germ.* xvii. t. 1112. A. Jacquemontii, *Duby l. c.* 50; *Mem. Prim.* t. 3, f. 1.

WESTERN HIMALAYA; in the drier regions from Kumaon to Kashmir and WESTERN TIBET, alt. 12–17,000 ft.—DISTRIB. Affghanistan, Caucasus, Alps, Asia Minor, Central and N. Asia.

Prostrate, in tufted masses of short naked stems and stolons bearing at close intervals villous rosettes ½–1 in. diam.; much resembling a very small state of *A. sarmentosa* or *lanuginosa*, but the corolla has a prominent conical ring at the mouth. The scapes are sometimes shortened, and the umbels sessile. Boissier identifies *A. Jacquemontii* with *A. villosa*, I think rightly. I distinguish it from states of *A. Chamæjasme* with great difficulty.

11. **A. Hookeriana,** *Klatt in Linnæa* xxxii. 293, t. iii. f. 1; sparingly pubescent, loosely tufted, stolons and branches rigid divaricate, rosettes of few unequal small petioled obovate or elliptic obtuse flat leaves, scapes solitary slender few-fld., bracts linear, calyx-lobes obtuse, corolla-lobes obovate, tips retuse, mouth annulate.

SIKKIM HIMALAYA; Lachen, alt. 12–14,000 ft., *J. D. H.*

Branches divaricating. *Leaves* ¼–½ in., narrowed into petioles of sometimes the length of the blade. *Scapes* ¼–3 in. *Corolla* much larger than the calyx, pink. *Capsule* 2-seeded.

12. **A. Chamæjasme,** *Host*; *Boiss. Fl. Orient.* iv. 14; laxly villous with jointed hairs, loosely tufted, stolons and branches slender, rosettes of many densely tufted sessile small obovate ovate-oblong or -lanceolate spreading or imbricating leaves, scape solitary hairy few-fld., bracts linear-oblong or spathulate equalling the pedicels, calyx-lobes obtuse, corolla-lobes longer obovate, tips rounded, mouth annulate. *Duby in DC. Prodr.* viii. 51; *Reichb. Ic. Crit.* vi. t. 580; *Ic. Fl. Germ.* xvii. t. 1112; *Lodd. Bot. Cab.* t. 232. A. villosa, *Jacq. Fl. Austr.* t. 352.

WESTERN TIBET, *Henderson*; Barjila and Karakoram, alt. 12–15,000 ft., *Clarke.*—DISTRIB. Alps, Arctic Russia, Central and N. Asia, Arctic America.

VAR. *coronata*; leaves densely tufted imbricate shorter and narrower, mouth of corolla with the ring prominent.—Western Tibet, alt. 16–17,000 ft., *H. Strachey, Henderson.*

VAR. *uniflora*; leaves densely imbricate, scape very short 1–2-fld.—Western Tibet; Ralam, N. of Kumaon, *Strach. & Winterb.*, No. 8.

Apparently identical with the European, &c., plant, and like it variable in the size of the whole plant and of the leaves. *Rosettes* ⅓–½ in. diam. *Leaves* ¼–⅓ in., obtuse or subacute. *Flowers* and *capsules* as in *A. Hookeriana.*

*** *Scapes solitary, 1–2-fld., or peduncle 1-fld.*

13. **A. muscoidea,** *Duby in DC. Prodr.* viii. 48; villous, stems elongate forming dense broad patches, leaves densely imbricated in close-set globose

balls the size of a pea sessile linear or oblong obtuse incurved, scape very short 1-fld. ebracteate, calyx cleft one-third way down, lobes subacute, corolla-lobes obovate, tips rounded.

KASHMIR; *Jacquemont, Falconer.*

Patches 6–10 in. diam., of crowded branches and stolons 2–6 in. long, naked below or covered almost throughout their length with the little balls of leaves. *Flowers* numerous, $\frac{1}{10}$ in. diam.; pedicels $\frac{1}{16}$–$\frac{1}{10}$ in. *Calyx* between turbinate and hemispheric.—I can hardly doubt this being the plant described by Duby, though the calyx is not 5-partite, nor its lobes lanceolate.

14. **A. globifera,** *Duby in DC. Prodr.* viii. 48; pubescent, stems very short forming small patches, leaves densely imbricate in subsolitary globose balls the size of a pea sessile broadly obovate obtuse or subacute incurved with pubescent surfaces and long silkily ciliate margins, the older glabrate, scape very short 1-fld. ebracteate, calyx cleft one-third way down, lobes obtuse, corolla-lobes obovate, tips rounded.

KUMAON, *Jacquemont*; Barjikang Pass and Rogila, alt. 12–15,000 ft., *Madden, Strach. & Winterb.*, &c.

This may be a high alpine state of *A. Chamæjasme*, with short much broader and sessile leaves, and solitary flowers. The floral bract, though apparently absent, is in this species and its allies at the base of the pedicel amongst the leaves.

15. **A. Selago,** *Hook. f. & Thoms. mss.*; *Klatt in Linnæa*, xxxii. 292; silkily shortly villous forming spherical tufts, branches densely packed radiating from the root interruptedly or uniformly clothed with compactly imbricating minute leaves hence cylindric and obtuse, leaves sessile linear- or cuneate-obovate obtuse membranous and glabrous below the middle coriaceous and silkily ciliate above it, uppermost elliptic subacute incurved, scape 1–2-fld. and bract villous, calyx cleft below the middle, lobes oblong obtuse, corolla-lobes obovate-oblong obtuse.

SIKKIM HIMALAYA, and North of it, in the Tibetan region, alt. 15–18,000 ft., *J. D. H.*

Root woody; branches with the leaves $\frac{1}{8}$–$\frac{1}{6}$ in. diam., extremities silvery. *Leaves* $\frac{1}{14}$–$\frac{1}{12}$ in. long. *Scape* slender, $\frac{1}{10}$ in.; bracts silky, equalling the flower, which is $\frac{1}{12}$ in. diam. *Calyx* hemispheric, $\frac{1}{2}$ in. diam, enclosing the capsule. *Seeds* 2, minute, irregularly oblong or ellipsoid.—A singular and beautiful plant.

16. **A. Lehmanni,** *Wall. Cat.* 617; densely tufted, glabrous except the minute woolly scales sunk in the rosettes and the inflorescence, leaves in continuous or interrupted subsquarrose whorl-like rosettes subulate or oblong-lanceolate acuminate sessile spreading and recurved from a broad imbricating membranous base, scape 1-fld. very short ebracteate and flower glandular-pubescent, calyx turbinate, lobes short obtuse, corolla-lobes orbicular. *Duby in DC. Prodr.* viii. 48.

NIPAL; *Wallich.* SIKKIM, at Jongri, alt. 12–14,000 ft.; *J. D. H., T. Anderson.*

A very singular species, of a dark chestnut colour when dry, and squarrose habit. *Stems* 1–4 in., with the leaves $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in. long, rather rigid, their dark colour contrasting with the snow-white clusters of minute lanceolate scales that nestle in the centre of the rosettes. *Pedicels* $\frac{1}{16}$–$\frac{1}{10}$ in. long. *Calyx* $\frac{1}{12}$ in. diam.

UNDETERMINABLE SPECIES.

A. CORDIFOLIA, *Wall. in As. Research.* xiii. 371, and *in Roxb. Fl. Ind.* ii. 17; villous, leaves ovate-cordate obtuse sinuate crenulate, scapes almost equalling the petioles, umbels 5-fld., bracts setaceous, calyx campanulate shorter than the corolla, enlarging over the fruit.—Forests of Nipal.

3. **CORTUSA**, *Linn.*

Scapigerous perennial pubescent herbs. *Leaves* long-petioled, rounded-cordate, 7–9-lobed. *Scape* slender. *Flowers* umbelled, purple. *Calyx* campanulate, 5-lobed. *Corolla* between funnel- and bell-shaped, tube short; throat naked; lobes 5, oblong, obtuse. *Anthers* 5, subsessile at the base of the corolla, sagittate, connivent, acute. *Style* filiform, exserted. *Capsule* ovoid, 5-valved, many-seeded.—DISTRIB. Species 1 or 2; natives of Mid-Europe, N. Asia and the N.W. Himalaya.

C. Matthioli, *Linn.*; *DC. Prodr.* viii. 55; *Reichb. Ic. Fl. Germ.* t. 1081; *Bot. Mag.* t. 987.

KASHMIR and LAHUL, alt. 7–9000 ft., *Jacquemont, Falconer*, &c.—DISTRIB. Affghanistan, Alps of Europe, N. Asia.

Leaves membranous, 1–4 in. diam.; lobes shallow, crenate-toothed; petiole 4–6 in. *Scapes* much taller than the petioles. *Umbels* 6–10-fld.; pedicels slender, very unequal; invol. bracts $\frac{1}{8}$–$\frac{1}{4}$ in., lanceolate. *Calyx* small, lobes ovate. *Corolla* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., cleft to the middle.

4. **BRYOCARPUM**, *Hook. f. & Thoms.*

A scapigerous glabrous herb. *Leaves* ovate or ovate-cordate, obtuse, subcrenate, with scattered orbicular scales beneath; petiole winged. *Scapes* slender, 1-fld. *Flower* nodding, yellow. *Calyx* of 7 subulate-lanceolate divisions. *Corolla* between funnel- and bell-shaped, 7-lobed to the middle, throat naked, lobes 2-fid. *Stamens* 7, filaments short; anthers oblong, acuminate. *Ovary* narrowly oblong, scaly; style slender; placenta columnar. *Capsule* elongate-cylindric, many-seeded, the top with the style falling away.

B. himalaicum, *Hook. f. & Thoms. in Kew Journ. Bot.* ix. 199, t. 5.

SIKKIM HIMALAYA; in pine woods at Lachen, alt. 8–10,000, *J. D. H.*

Rootstock stout. *Leaves* $\frac{1}{2}$–3 in. long, coriaceous; petiole about as long. *Scapes* 1–3, much longer than the leaves, very slender. *Corolla* $\frac{3}{8}$ in. long, twice as long as the calyx. *Capsule* 2–2$\frac{1}{2}$ in. long, erect, very membranous. *Seeds* (young) orbicular.

5. **LYSIMACHIA**, *Linn.*

Erect procumbent or creeping herbs. *Leaves* quite entire, opposite alternate or whorled. *Flowers* solitary racemed or spicate. *Calyx* 5–6-partite. *Corolla* rotate or funnel-shaped, 5–6-partite. *Stamens* inserted on the base of the corolla-lobes. *Ovary* subglobose; style filiform, persistent, ovules many. *Capsule* globose or subglobose, 5-valved or bursting irregularly, many-seeded. *Seeds* trigonous or plano-convex.—Species about 60; chiefly N. temperate.

A. *Flowers* white or pale pink. *Corolla* funnel-shaped; segments obovate-spathulate. *Filaments* quite free from one another at the base. *Leaves* alternate, rarely opposite.

* *Flowers in elongate terminal racemes; pedicels longer than the linear or subulate bracts.*

† *Stamens longer than the corolla.*

1. **L. Leschenaultii,** *Duby in DC. Prodr.* viii. 61; *Mem. Prim.* t. 4;

erect, leaves elliptic-lanceolate acute closely gland-dotted, racemes dense-fld., pedicels ½ in., fruiting 1 in., bracts filiform, petals exceeding the calyx. *Wight Ic.* t. 1204; *Fl. des Serres,* x. t. 982; *Klatt, die Gatt. Lysim.* t. 7. L. Clementsoniana, *Wall. Cat.* 1485. L. Notoniana, *Wall. mss.*

NILGHERRY and PULNEY MTS., *Leschenault,* &c.

Glabrous. *Stem* 6–8 ft., robust, branched. *Leaves* 2–4 in., acute or acuminate, sessile or petioled, margin smooth or crisp. *Racemes* 3–9 by 1½–2½ in., leafless except at the base. *Flowers* ⅓–½ in. long. *Sepals* lanceolate, acuminate, margins membranous, disk with oblong glands. *Corolla-lobes* obovate-spathulate. *Filaments* eglandular; anthers oblong, exserted. *Capsule* ⅛–⅙ in. diam.

2. **L. lobelioides,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 29; *Cat.* 1484; suberect or ascending, leaves elliptic-ovate or lanceolate, margin only gland-dotted, racemes long lax-fld., pedicels ½ in., fruiting ¾ in., bracts subulate, petals exceeding the calyx. *Duby in DC. Prodr.* viii. 61; *Bot. Reg.* 1842, t. 6; *Klatt, die Gatt. Lysimach.* t. 2. L. secunda, *Ham. in. Don Prodr.* 84.

WESTERN and CENTRAL HIMALAYA, alt. 4–7000 ft.; from Nipal to Kashmir.—DISTRIB. Java.

Glabrous, annual, 1–2 ft. *Stem* branched from the base. *Leaves* 1–1½ in., acute, narrowed into a short petiole. *Racemes* 6–8 in. in flower, to 18 in. in fruit; pedicels spreading and decurved in fruit. *Flowers* ¼–⅓ in. long, white or pale purplish, sweet-scented. *Sepals* lanceolate, margins white, disk with very long glands. *Corolla-lobes* obovate. *Filaments* eglandular; anthers oblong, exserted. *Capsule* ⅙ in. diam.—Lindley (in Bot. Reg.) describes the capsule as bursting irregularly at the base. This I have not seen. The dehiscence is irregular, but usually by valves.

3. **L. javanica,** *Bl. Bijd.* 736; erect, leaves elliptic-ovate or lanceolate more or less gland-dotted and margined, racemes long lax-fld., pedicels ½ in., fruiting ¼ in., bracts subulate, petals hardly exceeding the sepals. *Klatt, die Gatt. Lysimach.* t. 5. L. multiflora, *Wall. Cat.* 1487; *Duby in DC. Prodr.* viii. 63; *Klatt l. c.* t. 4. L. acroadenia, *Maxim. Diagn. Pl. Jap. Dec.* iv. and v. 272. L. consobrina, *Hance mss.* L. decurrens, *Herb. Hance.*

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4–6000 ft. ASSAM and SILHET.—DISTRIB. Java, China, Japan, Isle of Pines, New Caledonia.

Very similar to *L lobelioides*, but a much more robust and erect plant, with shorter pedicels and smaller petals, and glandular filaments. The capsules burst very irregularly. The amount of glandular dots on the leaves varies exceedingly; they are sometimes confined to the margin.

†† *Stamens shorter than the corolla.*

4. **L. obovata,** *Herb. Ham.*; *Wall. Cat.* 1488; erect, slender, simple or sparingly branched, leaves obovate spathulate or oblanceolate minutely gland-dotted, racemes long lax-fld., pedicels fruiting and flowering ⅛–½ in., bracts subulate, corolla-lobes obovate nearly twice as long as the sepals. L. glaucescens, *Wall. mss.*

HINDOSTAN and MAINPUR, *Herb. Wallich.* BIRMA, *Griffith.*—DISTRIB. Java.

Smaller than any of the preceding species, more or less glaucous. *Stem* 6–18 in., sometimes branched from the base. *Leaves* ½–3 in., acute or obtuse, usually petioled. *Racemes* 2–8 in.; bracts about half as long as the pedicels. *Corolla-segments* obovate. *Filaments* short; anthers apiculate. *Capsule* ⅛ in. diam., bursting irregularly.—*L. candida,* Lindl., differs only in the longer stamens, if at all.

** *Flowers in elongate terminal racemes; bracts leafy, longer than the pedicels. Stamens shorter than the corolla.*

5. **L. pyramidalis,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 28; *Cat.* 1486; erect, much branched, leaves linear-lanceolate minutely gland-dotted and margined, racemes long lax-fld., pedicels $\frac{1}{4}$ in., fruiting $\frac{1}{2}$ in., bracts linear, corolla-segments obovate longer than the sepals. *Duby in DC. Prodr.* viii. 62; *Klatt, die Gatt. Lysimach.* t. 16. L. heterophylla, *Don Prodr.* 84. Anagallis multangularis, *Ham.* (*ex Don*).

Central and Western Himalaya; from Simla to Central Nipal, alt. 5–8000 ft., Hawulbagh, *Jamieson*.

Glabrous. *Stem* 10–24 in., branches erect. *Leaves* 1–2$\frac{1}{2}$ in., rarely ovate-lanceolate. *Racemes* 6–10 in.; lower bracts 1 in. *Sepals* narrowly lanceolate, with slender membranous margins. *Corolla* $\frac{1}{4}$ in. long, white, lobes crenulate or toothed. *Filaments* short, glabrous; anthers apiculate. *Capsule* as in the previous species, bursting irregularly.

6. **L. chenopodioides,** *Watt in Journ. Linn. Soc. ined.*; erect or decumbent, branched, leaves petioled elliptic ovate or rhomboid acute or acuminate gland-dotted and margined, flowers sessile and subsessile in the leaf axils, sepals linear about equalling the obovate-oblong corolla-segments. L. glandulosa, *Klatt, die Gattung Lysimachia*, t. 17 (*not of Edgeworth*).

Temperate Himalaya; from Kashmir to Bhotan, alt. 6–9000 ft. (not found in Nipal or Sikkim).

Very variable in habit, 12–18 in. high, glabrous, usually much branched. *Leaves* $\frac{1}{2}$–1 in.; petiole often as long as the blade. *Flowers* $\frac{1}{5}$ in. long, sometimes subracemose, with narrower recurved floral leaves. *Sepals* with several series of large long glands down the centre. *Filaments* very short; anthers obtuse. *Capsule* $\frac{1}{8}$ in. diam., bursting irregularly.

7. **L. prolifera,** *Klatt, die Gatt. Lysim.* 30, t. 16; small, erect creeping or ascending, leaves petioled subacute ovate or the lowest spathulate obtuse gland-dotted but not margined, flowers in small terminal corymbs, pedicels very short, sepals linear obtuse or acute, filaments equalling or shorter than the linear-obovate corolla-segments.

Temperate Himalaya; Garwhal at Dordotoole, alt. 10,000 ft., *Madden*; Kumaon, Madhari Pass, alt. 9000 ft., *Strach. & Winterb.*; Sikkim, alt. 8–10,000 ft., *J. D. H.*, &c.

Perennial, 4–6 in. high, glabrous or puberulous towards the ends of the branches, simple or branched from the base. *Leaves* opposite and alternate, 1–1$\frac{1}{2}$ in., including the petiole, which often equals the blade. *Flowers* in small terminal corymbs amongst the uppermost leaves; pedicels equalling the calyx, or longer. *Corolla* funnel-shaped, $\frac{1}{4}$ in., pale flesh-coloured or white. *Filaments* glabrous, very variable in length; anthers obtuse, often exserted from the expansion of the corolla. *Fruit* not seen.

B. *Flowers* yellow. *Corolla* rotate; segments broad, oblong or obovate. *Filaments* connected at the base by a membrane or ridge.

* *Leaves alternate.*

8. **L. ramosa,** *Wall. Cat.* 1490; erect, branches winged, leaves lanceolate faintly gland-dotted, pedicels capillary usually equalling or exceeding the subtending leaves, sepals ovate acuminate, anthers subsagittate apiculate. *Duby in DC. Prodr.* viii. 65; *Klatt, die Gatt. Lysimach.* t. 17.

Eastern Himalaya; Sikkim, alt. 5–8000 ft. Khasia Mts., alt. 4–6000 ft. Birma, at the serpentine mines, *Griffith*.—Distrib. Java.

Quite glabrous, annual (?). *Stem* 2–4 ft.; branches long, slender, erecto-patent.

Leaves alternate, 2–4 in., thin, acuminate, narrowed into the short petiole. *Peduncles* all axillary, 1–5 in., spreading. *Flowers* $\frac{1}{2}$ in. diam., yellow. *Sepals* sub-glandular, $\frac{1}{8}$–$\frac{1}{6}$ in. long. *Corolla-segments* elliptic-oblong. *Filaments* very short, connected at the base, with sometimes an obscure staminode between them. *Capsule* $\frac{1}{3}$ in. diam., bursting irregularly.—Java specimens have larger sepals, approaching var. *zeylanica*.

Var. *zeylanica*; leaves larger 3–5 in., sepals larger $\frac{1}{4}$–$\frac{1}{3}$ in. longer pointed, capsule larger 5-valved. L. alata, *Gard. mss.*—Ceylon, Central Province, alt. 6–8,000 ft.

9. **L. peduncularis,** *Wall. Cat.* 1489; slender, erect, branches winged, leaves lanceolate faintly gland-dotted, peduncles capillary much exceeding the subtending leaves, sepals narrow-lanceolate.

Birma; Taongdong Mts. and Prome Hills, *Wallich.*

A much smaller plant than *L. ramosa* with the peduncles longer and with more slender and narrow sepals. *Flowers* not seen. *Fruit* capsular.

10. **L. linearifolia,** *Griff. mss.*; stem strict terete, leaves subsessile linear-lanceolate acuminate, peduncles capillary exceeding the leaves, sepals narrow-lanceolate.

Birma; at the serpentine mines, *Griffith.*

Annual. *Stem* 12–18 in., slender or sparingly branched, puberulous above. *Leaves* rather crowded, uniform in size and shape all along the stem, $1\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., acute at both ends, opaque, dark-brown when dry, midrib strong. *Peduncles* decurved in fruit.—Of this singular plant I have seen no remains of flower except the sepals, nor of the fruit except the persistent placenta. The leaves are from their colour very different looking from those of any other species.

11. **L. evalvis,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 27; *Cat.* 1483; stem subterete flexuous erect or ascending, leaves petioled elliptic or ovate acuminate sparingly gland-dotted, peduncles few equalling or shorter than the leaves decurved, sepals ovate-cordate acuminate. *Duby in DC. Prodr.* viii. 66; *Klatt, die Gatt. Lysimach.* t. 22.

Central and Eastern Himalaya; Nipal, *Wallich*; Sikkim, alt. 4–6000 ft. Khasia Mts., alt. 3–5000 ft.—Distrib. China (?).

Quite glabrous. *Stem* 10–18 in., obscurely angled. *Leaves* rather distant, $1\frac{1}{2}$–3 in., finely acuminate, petiole long or short. *Peduncles* very variable, sometimes only $\frac{1}{2}$ in. long, rather stout, decurved; flower $\frac{1}{2}$–$\frac{2}{3}$ in. diam. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., reflexed in fruit. *Corolla* yellow, segments longer than the sepals, oblong, obtuse. *Filaments* very short; anthers linear-oblong, obtuse. *Capsule* $\frac{1}{3}$ in. diam., very membranous, whitish, dehiscing irregularly.—This is apparently identical with the Chinese *L. Fœnum-græcum*, Hance mss., which is used by Chinese ladies as a scent for hair oil, but has no scent.

12. **L. alternifolia,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 26; *Cat.* 1481; glabrous or puberulous, branches ridged prostrate or ascending, leaves sessile or petioled elliptic-lanceolate or ovate acute, peduncles axillary capillary shorter or longer than the leaves, sepals lanceolate longer than the corolla gland-dotted. *Duby in DC. Prodr.* viii. 66; *Klatt, die Gatt. Lysimach.* t. 21. L. tetragona, *Don Prodr.* 83 (*excl. syn. L. evalvis*). L. quinquangularis, *Ham. mss.* (*ex Don*). L. glandulosa, *Edgew. in Trans. Linn. Soc.* xx. 83; *Klatt, l. c.* t. 22 (*excl. fig.* c.).

Temperate and Subtropical Himalaya, from Garwhal to Bhotan, alt. 2–6000 ft. Khasia Mts., Shillong, alt. 4000 ft.; *Clarke.*

Branched from the base; branches 2–8 in., leafy throughout. *Leaves* 1–$\frac{1}{2}$ in. *Flowers* numerous, $\frac{1}{2}$ in. diam. *Corolla* yellow, segments oblong, obtuse, sparingly gland-dotted. *Filaments* short, united by a very short basal ridge. *Ovary* glabrous. *Capsule* bursting by valves, shorter than the calyx.

** *Leaves opposite, rarely 3-nate or alternate. Capsule bursting by valves.*

13. **L. japonica,** *Thunb. Fl. Jap.* 83; *Icones,* t. 16; prostrate, pubescent or villous, leaves ovate acute gland-dotted, peduncles solitary or 2-nate very short, sepals lanceolate villous longer than the corolla reflexed in fruit, filaments united at the base by a broad membrane, ovary hirsute. *Duby in DC. Prodr.* viii. 67; *Klatt, die Gatt. Lysim.* t. 19. L. debilis, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 25; *Cat.* 1482; *Duby l. c.* 66; *Klatt, l. c.* t. 20. L. ferruginea, *Edgew. in Trans. Linn. Soc.* xx. 84.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, alt. 4–8000 ft. KHASIA MTS., alt. 3–5000 ft.—DISTRIB. China, Japan.

Branches 6–10 in. terete, weak. *Leaves* 1–1½ in., usually petioled. *Peduncles* very variable in length, spreading decurved or upcurved. *Corolla* yellow, ¼–⅓ in. diam.; segments oblong, gland-dotted. *Filaments* long, but shorter than the corolla, glabrous. *Capsule* much shorter than the sepals.—A specimen apparently of this plant procured in Sikkim by Griffith's collectors has the leaves alternate, very short pedu n les, longer filaments with a shorter connecting membrane and hairy ovary; it a good deal resembles Klatt's figure of *L. ferruginea,* Edgew., and is intermediate between *alternifolia* and *japonica.*

14. **L. deltoides,** *Wight Ill.* ii. 137, t. 144; hirsute, procumbent, branches ascending, leaves ovate or broadly oblong obtuse or acute, peduncles solitary or 2-nate about as long as the leaves, sepals lanceolate villous shorter than the corolla, filaments united at the base by a very narrow membrane, ovary glabrous. *Klatt, die Gatt. Lysim.* t. 19. L. Metziana, *Hohen. Pl. Exsicc. Ind. Or.* No. 1443, 1444.

NILGHERRY and PULNEY MTS., *Wight,* &c.

Much branched from the base; branches rooting below, terete. *Leaves* often 3-nate, ¾–1½ in., more or less hairy on both surfaces. *Peduncles* usually decurved in fruit. *Corolla* yellow, ⅔ in. diam., segments obovate, gland-dotted. *Capsule* bursting by valves, shorter than the corolla.

VAR. *cordifolia*; leaves cordate or truncate at the base. L. umbrosa, *Gardn. mss.* L. japonica, *Thwaites Enum.* 172.—Ceylon, alt. 6–7000 ft.

6. GLAUX, *Tournef.*

A succulent glabrous creeping stoloniferous herb. *Leaves* decussate. *Flowers* small, axillary, sessile, white or pink. *Calyx* 5-partite, coloured. *Corolla* 0. *Stamens* 5, hypogynous, alternate with the calyx-segments. *Ovary* subglobose; style filiform; ovules few. *Capsule* globose, 5-valved, few-seeded. *Seeds* peltate, terete, rough.

G. maritima, *Linn.*; *Boiss. Fl. Orient.* iv. 7.

WESTERN TIBET; alt. 12–15,000 ft., *Falconer,* &c.—DISTRIB. N. temperate and Arctic regions.

Stem 6–10 in., procumbent or with suberect branches. *Leaves* ¼–¾ in., linear- or obovate- or ovate-oblong. *Calyx* ⅛–¼ in. long, campanulate, lobes obtuse, margins scarious. *Anthers* subexserted. *Capsule* small, cuspidate.

7. ANAGALLIS, *Tournef.*

Slender annual or perennial herbs. *Leaves* opposite, quite entire. *Flowers* axillary, solitary, peduncled, ebracteate, red or blue, rarely white. *Calyx* 5-partite. *Corolla* rotate, 5-partite. *Stamens* 5, filaments villous. *Ovary* globose;

style filiform; ovules many, amphitropous. *Capsule* globose, circumsciss. *Seeds* many, peltate, plano-convex.—N. temperate regions, and temperate S. America.

A. arvensis, *Linn.*; *Boiss. Fl. Orient.* iv. 6; annual, erect or procumbent, leaves sessile ovate cordate or lanceolate acute dotted, sepals almost equalling the blue or red corolla. *Wall. in Roxb. Fl. Ind.* ii. 24; *Cat.* 1492.

BENGAL, NORTH-WESTERN INDIA, and the HIMALAYA from Nipal westwards ascending to 5000 ft. CENTRAL INDIA, the NILGHERRY HILLS, and CEYLON (perhaps introduced).—DISTRIB. Europe, West Asia, and introduced into most temperate regions.

Glabrous, gland-dotted, branched from the base; branches 4-angled, ascending. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., rarely whorled. *Peduncles* 1–2 in., erect in flower, decurved in fruit. *Sepals* narrow, lanceolate, acuminate. *Corolla* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., closing in dull weather, segments often ciliate. *Capsule* size of a small pea. *Seeds* 3-gonous.—Both the blue and red-fld. vars. are found in Western India; the blue (*A. cærulea*, Lam.) being the common one eastward.

8. CENTUNCULUS, *Linn.*

Small annual herbs. *Leaves* subopposite or alternate. *Flowers* minute, solitary, axillary, ebracteate, white or pink. *Calyx* 4–5-partite. *Corolla* short, urceolate. *Stamens* 4–5, on the corolla-throat, filaments flattened; anthers exserted. *Ovary* subglobose; style filiform; ovules many. *Capsule* globose, circumsciss. *Seeds* many, peltate. Species 3 or 4; Europe, Asia, America.

C. tenellus, *Duby in DC. Prodr.* viii. 72; erect, leaves alternate subsessile ovate orbicular or obovate obtuse or acute, flowers 4–5-merous, sepals lanceolate, tube of corolla subglobose, lobes ovate-lanceolate. *Wight Ic.* t. 2000. Lysimachia tenella, *Wall. Cat.* 1491. Micropyxis pumila, *Duby l. c.* M. tenella, *Wight l. c.* t. 1585.

CENTRAL and WESTERN HIMALAYA; Nipal, Kumaon, Dalhousie, alt. 4000 ft. CENTRAL INDIA; Chota Nagpore and Parasnath, *Clarke.* NILGHERRY and PULNEY MTS.—DISTRIB. Tropical America and Australia.

9. SAMOLUS, *Tournef.*

Annual or perennial herbs. *Leaves* radical and alternate. *Flowers* in terminal racemes or corymbs, white; pedicels bracteate. *Calyx* $\frac{1}{2}$-superior, 5-fid. *Corolla* perigynous, subcampanulate, 5-partite. *Stamens* 5, alternating with staminodes, filaments very short. *Ovary* subglobose; style short; ovules many, anatropous. *Capsule* $\frac{1}{2}$-inferior, ovoid, crown 5-valved. *Seeds* many, angular, hilum basilar.—Species about 8; temperate regions.

S. Valerandi, *Linn.*; *Boiss. Fl. Orient.* iv. 5; leaves obovate or spathulate obtuse or apiculate *Wall. Cat.* 1508.

WESTERN HIMALAYA; from Sirmore, alt. 3–4000 ft., westwards.—DISTRIB. Most temperate regions.

Glabrous. *Rootstock* short. *Stem* $\frac{1}{2}$–2 ft., erect, decumbent or ascending, often rooting at the base. *Leaves* 1–4 in., quite entire, radical rosulate, cauline alternate. *Racemes* $\frac{1}{2}$–6 in., erect; pedicels ascending with the adnate bract above their middle. *Calyx-tube* hemispheric, lobes triangular. *Corolla* $\frac{1}{8}$ in. diam.; lobes short, obtuse. *Capsule* $\frac{1}{4}$ in. diam. *Seeds* rugose.

ORDER LXXXVIII. **MYRSINEÆ.** (By C. B. Clarke.)

Shrubs or small trees. *Leaves* alternate, undivided, generally gland-dotted; stipules 0. *Flowers* regular, hermaphrodite or polygamo-diœcious. *Calyx* inferior (in *Mæsa* more or less adnate to the ovary); limb 4–6- (usually 5-) lobed, persistent, often somewhat enlarged on the fruit. *Corolla-tube* short or 0; segments 3–7 (usually 5), contorted or imbricate (rarely valvate). *Stamens* 3–7, opposite the corolla-lobes, free or adnate to the tube, in *Reptonia* alternating with staminodes; anthers usually oblong, acute, dehiscence longitudinal, very rarely by terminal pores; free or united by their margins. *Ovary* globose or oblong, free (in *Mæsa* semi-inferior), 1-celled, narrowed into the style; style filiform or columnar, stigma simple rarely shortly lobed; ovules few or many, inserted on a free central placenta. *Fruit* commonly small, globose (in *Ægiceras* linear, acute), often sub-baccate and coloured, 1- (or several-) seeded, indehiscent (except in *Ægiceras*). *Seeds* mostly globose, excavate at the base, albumen pitted or ruminate; embryo transverse.—Species 500; all Tropical or Subtropical.

TRIBE I. **Mæseæ.** *Calyx* nearly enclosing the many-seeded berry.

Calyx 2-bracteolate. Flowers racemed . . . . 1. MÆSA.

TRIBE II. **Eumyrsineæ.** *Calyx* free. *Staminodes* 0. *Fruit* 1-seeded.

* *Corolla-lobes imbricate or induplicate-valvate* (*rarely contorted*) *in bud.*

Flowers in axillary fascicles. Corolla imbricate . . . . . 2. MYRSINE.
Flowers racemed or panicled. Corolla imbricate or contorted . 3. EMBELIA.
Flowers spicate-paniculate. Corolla-segments induplicate-valvate 4. LABISIA.

** *Corolla-lobes contorted in the bud* (see also 3. *Embelia*).

† *Anthers free.*

Corolla-segments twisted to the right; calyx glabrous . . . 5. ARDISIA.
Corolla-segments twisted to the right; calyx pubescent . . . 6. PIMELANDRA.
Corolla-segments twisted to the left . . . . 7. ANTISTROPHE.

†† *Anthers united.*

Corolla middle-sized, segments acute . . . . 8. HYMENANDRA.
Corolla very small, segments emarginate . . . . 9. AMBLYANTHUS.

Anomalous genus with long filaments, and septate anthers.

Fruit cylindric, curved, acute . . . . 10. ÆGICERAS.

TRIBE III. **Theophrasteæ.** *Calyx* free. *Staminodes* 5. *Fruit* 1–2-seeded.

Flowers small, in axillary fascicles . . . . 11. REPTONIA.

1. **MÆSA,** *Forsk.*

Trees or shrubs. *Leaves* entire or serrate. *Racemes* axillary or terminal; pedicels bracteate at the base. *Flowers* small, 2-bracteolate, 1–2-sexual, 4–5-merous. *Calyx* half-inferior or nearly free, in fruit ½-adnate; teeth small, persistent. *Corolla* gamopetalous, campanulate; lobes round, much imbricate, sometimes unequal. *Stamens* 5, inserted on the corolla-tube; filaments short; anthers ellipsoid; staminodes 0. *Ovary* partially adnate to the calyx; style

short, stigma capitate or shortly 3–5-lobed; ovules numerous, placenta globose. *Berry* globose (in *M. mollis* hirsute), of the size of a peppercorn. *Seeds* numerous, subtrapezoid.—Species 35, in the tropics of the Old World.

The inflorescence is often monstrous, the flowers being replaced by densely imbricating bracteoles.

* *Leaves glabrous, sometimes scaly or furfuraceous when young.*

† *Leaves entire or obscurely denticulate.*

1. **M. ramentacea,** *A. DC. Prodr.* viii. 77; leaves coriaceous elliptic-lanceolate acuminate entire, base rounded or wide-rhomboid, secondary nervation obscure, racemes compound usually much longer than the petioles and often than the leaves. *Scheff. Myrsin.* 15; *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99. M. lanceolata, *Don Prodr.* 148 (*not of Forsk.*). M. acuminata, missionis *and* glabra, *A. DC. l. c.* 77, 78, 82. M. sumatrana, *Scheff. l. c.* Bæobotrys ramentacea, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 558; *Wall. Cat.* 2322. B. glabra, *Roxb. l. c.* 560. B. fragrans, *Wall. Cat.* 2323. B. acuminata, *Spreng. Syst. Index*, v. 89. B. ? missionis, *Wall. Cat.* 6523.

Eastern Bengal and the Eastern Peninsula, alt. 0–3000 ft., common from Bhotan to Singapore.—Distrib. Malaya to Borneo.

An erect tree, 30 ft., with straight stem and lanceolate outline; or more commonly a gregarious bush on the low dry hills; branches rarely verrucose. *Leaves* 4–5 by $1\frac{1}{2}$ in., margin slightly thickened; primary nerves conspicuous beneath, distant, about 8 on each side; petiole $\frac{1}{3}$ in. *Racemes* usually equalling the leaf, from half as long to twice as long, glabrous.—*Bæobotrys* (v. Mæsa) *acuminata*, Wall. Cat. 2321, is *Gymnosporia acuminata*, Hook. f.

Var. *ovata*, A. DC. in Trans. Linn. Soc. xvii. 133, t. 4 (sp.); leaves larger ovate or ovate-cordate. *Scheff. Myrsin.* 14. Bæobotrys ovata, *Wall. Cat.* 2324.—Penang; *Wallich*. South Malay Peninsula; frequent. Nicobars; *Kurz*.—Distrib. Malaya.—Leaves 6 by 3 in. in the extreme forms from the south, smaller in the Burmese examples, panicle sometimes very large in both. The figure of A. DC. does not show (as Scheffer has observed) the extreme form of *M. ovata*, but one near the type. Wallich's typical plant has cordate-ovate leaves, and nerves deeply impressed in the upper surface.

2. **M. andamanica,** *Kurz For. Fl.* ii. 575, and in *Journ. As. Soc.* 1877, pt. ii. 220; leaves coriaceous elliptic acuminate rounded at the base obscurely denticulate secondary nervation obscure, racemes as long or twice as long as the leaves. M. verrucosa, *Kurz For. Fl.* ii. 98, *not of Scheff.*

South Andaman Island; in forests, *Kurz*.

An evergreen, small tree; all parts glabrous; branches verrucose. *Leaves* 3 by $1\frac{1}{4}$ in., primary nerves 6–8 on each side; petiole $\frac{1}{4}$ in. *Racemes*, in Kurz's example in young flower, sometimes more than twice the petiole, not shorter than in some examples of *M. ramentacea*, from which it scarcely differs but by the minute denticulation of the leaves.

3. **M. rugosa,** *Clarke*; leaves coriaceous narrowly lanceolate caudate cuneate at the base obscurely denticulate rugose, racemes longer than the petioles scarcely one-third the length of the leaves. M. montana, *var.* coriacea, *Herb. Ind. Or. H. f. & T.*, *not* M. coriacea, *Champ.*

Sikkim, alt. 5–7000 ft.; in the upper valleys of the Teesta and Ratong, frequent; *J. D. H.*, &c.

A stout shrub, probably becoming a tree; branchlets very sparingly warted. *Leaves* $7\frac{1}{2}$ by $1\frac{1}{4}$ in., scaly or furfuraceous when young, glabrous or glandular-puberulous when old; primary nerves 12–15 on each side, much raised beneath, secondary uniting them at right angles, often subprominent, ultimate reticulating very obscure; petiole $\frac{3}{8}$ in. *Racemes* 1–2 in., panicled, glandular-puberulous or glabrous.

VAR. *Griffithii*; leaves ovate-lanceolate from a rounded base.—Bhotan, alt. 5–7000 ft.; *Griffith* (Kew Distrib. n. 3554), &c. Assam; *Simons.* Leaves $7\frac{1}{2}$ by $3\frac{3}{4}$ in., in Griffith's example from Chuki in East Bhotan; but in the West Bhotan examples, intermediate between this and the type.

†† *Leaves, or some of them, distinctly toothed.*

4. **M. Chisia,** *Don Prodr.* 148; leaves lanceolate or elliptic acuminate base cuneate, primary nerves approximate secondary distinctly reticulated, racemes axillary about half the length of the leaves. M. dioica, *A. DC. Prodr.* viii. 79. M. montana, *A. DC. l. c. for the most part.* Bæobotrys indica, *Wall. Cat.* 2318, A and B *only.*

From NIPAL to BHOTAN, alt. 2–6000 ft.; common. KHASIA MTS., alt. 3–5000 ft.; common.

A tree 30 feet, or more often a shrub. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{4}$ in., primary nerves about 12 on each side at right angles to the midrib; teeth 1–2 to each primary nerve, often obscure; petiole $\frac{1}{8}$ in. *Racemes* compound, $1\frac{1}{2}$–3 in.

5. **M. indica,** *Wall. note in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 230; leaves coriaceous lanceolate or elliptic shortly acute or acuminate base rhomboid secondary nervation obscure, racemes axillary shorter than the leaves. *A. DC. Prodr.* viii. 80; *Scheff. Myrsin.* 22; *Dalz. & Gibs. Bomb. Fl.* 136; *Brand. For. Fl.* 283; *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99; M. montana, *A. DC. l. c. partly.* Bæobotrys indica, *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 557; *Wight Ic.* t. 1206; *Bot. Mag.* t. 2052; *Wall. Cat.* 2318, *except* A, B. B. nemoralis, *Roxb. Fl. Ind.* i. 559; *Wall. Cat.* 2319; *Mart. Pflanz. Gart. Münchens* 9, t. 6 (*not of Vahl.*).

Throughout INDIA, alt. 0–6000 ft.; from the HIMALAYA, eastward from the Ganges (*Brandis*), to CEYLON and SINGAPORE, in and near the hills, very common.—DISTRIB. Malaya, S. China, ? Madagascar, ? Africa.

An erect tree, 30 feet; or a shrub on lands gone out of cultivation. *Leaves* 5 by $1\frac{3}{4}$ in., primary nerves about 7 on each side the midrib, oblique thereto; teeth 1–3 to each primary nerve; petiole $\frac{1}{2}$ in. *Racemes* compound, $1\frac{1}{2}$–4 in.—The leaves in *B. indica* of Roxburgh, from Chittagong, are large, broadly elliptic, coriaceous, subentire; in *B. nemoralis*, Roxb., smaller, distinctly toothed; in *M. indica*, var. *angustifolia*, H. f. & T., very narrowly lanceolate. *M. indica*, var. *latifolia*, H. f. & T. (from Khasia), has ovate, subentire leaves, and short racemes; it is *M. pyrifolia*, Miq. (Fl. Ind. Bat. ii. 1008), and hardly differs from *M. latifolia* (A. DC. l. c. 78) unless by its compound racemes. *M. indica*, var. *Wightiana* (South Indian and Ceylon) has more membranous leaves, the reticulated nervation somewhat prominent; this form, abundant in Malaya, is *M. virgata* (A. DC. l. c. 78). There are other forms described as species by Javan botanists.

VAR. *Perottetiana*, A. DC. l. c. 80 (sp.); leaves 5 by $2\frac{1}{4}$ in. cinereous regularly acutely serrate.—Nilgherries, alt. 7000 ft., common.

VAR. *maxima*; leaves 7 by $5\frac{3}{4}$ in. subcordate orbicular, panicles dense, primary branches again panicled.—Assam, *Simons.*—Panicles $3\frac{1}{2}$ by 3 in.

6. **M. paniculata,** *A. DC. in Trans. Linn. Soc.* xvii. 133, and *Prodr.* viii. 78; leaves membranous elliptic acute base rounded or rhomboid secondary nervation obscure, racemes axillary and terminal lax compound much longer than the leaves. *Kurz in Journ. As. Soc.* 1877, pt. ii. 220, and *For. Fl.* ii. 99. Bæobotrys paniculata, *Wall. Cat.* 2320.

SILHET; Pundua, alt. 250 ft., *H. F. & T.* TAVOY, *Wallich.* TENASSERIM, *Griffith, Helfer* (Kew Distrib. n. 3559).

A shrub, or probably sometimes a tree; branches verrucose. *Leaves* $8\frac{1}{2}$ by 4 in. (in Wallich's plant, not 2 in. in other examples), slightly toothed, primary nerves about 7 on each side, the ultimate reticulations obscure beneath; petiole $\frac{2}{3}$ in. *Panicle* (even a single axillary) 15 in. long in the examples of H. f. & T. (which have,

however, been referred to *M. indica*). Except in the very long, lax, narrow panicles this does not differ from *M. indica.*

** *Leaves hairy, when old sometimes glabrescent.*

7. **M. dubia,** *Wall. in Roxb. Fl. Ind. ed. Carey and Wall.* ii. 235; leaves elliptic acute, racemes compound about half as long as the leaves, fruit $\frac{1}{12}$ in. broad. *A. DC. Prodr.* viii. 81. M. canarana, *Miq. in Pl. Hohenack.* n. 429. M. indica, var., *Bedd. For. Man.* 137, t. xviii. 4, fig. 1 *only.* Bæobotrys dubia, *Wall. Cat.* 2317, *right-hand fragment only.*

MALABAR MTS.; Canara, *Ritchie, Hohenacker*; Concan and Mysore, *Stocks, Law.*
A shrub, more or less hairy; branches villous, at least at the tips. *Leaves* 7 by $3\frac{1}{2}$ in., or only half as large, toothed, base rounded or cuneate, villous on both surfaces, or sparingly so beneath when young, ultimately glabrescent, primary nerves about 10 on each side. *Racemes* rusty-villous or pubescent, or sparingly pilose.—The left-hand example in the type sheet of Wall. Cat. 2317 is *M. indica*, var. *Perottetiana*, but it comes from the same locality as *M. dubia*; and, except that it is perfectly glabrous, it is hard to say how it differs.

8. **M. argentea,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 233; leaves large ovate-lanceolate more or less hairy when young often white beneath, racemes short sparsely pilose or glabrescent, fruits $\frac{1}{8}$-$\frac{1}{6}$ in. broad. *A. DC. in Ann. Sc. Nat.* 2, xvi. t. 5 B, and *Prodr.* viii. 81; *Brand. For. Fl.* 283. Bæobotrys argentea, *Wall. Cat.* 2316.

WESTERN and CENTRAL HIMALAYA; Gurwhal, alt. 4000 ft., *Stewart.* KUMAON, alt. 5000 ft., *Strach. & Winterb., Madden.* NIPAL, *Wallich.* EAST NEPAL, alt. 3–7000 ft., *J. D. H.*
A large shrub; branches hairy, at least at the tips. *Leaves* 8 by 4 in., narrowed at both ends, more or less hairy above, and at least on the midrib beneath, primary nerves about 11 on each side, reticulated nerves obscure. *Racemes* 1–$1\frac{1}{2}$ in. in fruit, usually once branched.—This species is easily distinguished by the fruits being larger than in the other Indian species.

9. **M. macrophylla,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 234; leaves large elliptic or orbicular softly hairy on both surfaces base cordate, racemes panicled often as long as the leaves shortly pubescent. *A. DC. Prodr.* viii. 81. M. tomentosa, *Don Prodr.* 148. Bæobotrys macrophylla, *Wall. Cat.* 2325.

From NIPAL to BHOTAN, alt. 3–5000 ft., frequent, *Wallich, Griffith, J. D. H.*, &c.
A large shrub, 6–14 ft.; branches closely pubescent. *Leaves* 8 by $5\frac{1}{2}$ in., obtuse, regularly serrate; petiole 1 in. *Panicles* 5–10 in., axillary and sometimes terminal, compound. *Fruit* $\frac{1}{12}$ in. diam., nearly as of *M. indica.*

10. **M. mollis,** *A. DC. in Trans. Linn. Soc.* xvii. 134, and *Prodr.* viii. 82; leaves lanceolate acuminate toothed ferruginous hairy on the nerves beneath base cuneate, racemes very small hirsute, flowers 5-merous, fruits hirsute. *Scheff. Myrsin.* 26. M. mollissima, *Kurz For. Fl.* ii. 100, and *in Journ. As. Soc.* 1877, pt. ii. 220 (*not of A. DC.*). M. permollis, *Kurz in Journ. As. Soc.* 1871, pt. ii. 66. M. fulvinervis, *A. DC. in Ann. Sc. Nat.* 2, xvi. 80, and *Prodr. l. c.* 82. Bæobotrys mollis, *Blume Bijd.* 865.

PEGU; *Kurz*, n. 3002. TENASSERIM; *Brandis.*—DISTRIB. Java.
A shrub, 6 ft. (Kurz). *Leaves* $7\frac{1}{2}$ by 2 in., primary nerves 9 on each side, oblique; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., fulvous-hairy. *Racemes* hardly as long as the petioles, little divided, densely fulvous-hirsute; bracts and bracteoles minute. *Fruits*, when nearly ripe, fulvous-hirsute. Described from Kurz's n. 3002 (named by him *M. mollissima*, Wall., a name not found in Wallich's Herbarium), which agrees closely with authentic Javan specimens of *M. mollis*, but the leaves are rather larger. Kurz's description of *M. mollissima*, Wall. (For. Fl. ii. 100), does not exactly suit his own example (n.

3002), but applies chiefly to the var. following. Wallich's *M. mollissima* is a very different plant.

VAR. *latifolia*?, Kurz; leaves 6½ by 4½ in. more hairy, racemes very compound.—Namyoon, in the Patkoye district S.E. of Assam; *Griffith* (Kew Distrib. n. 3555).—*Leaves* roundly elliptic ciliate cuspidate sprinkled with fulvous long hairs on both surfaces, base rounded or rhomboid, primary nerves 12 on each side, ending in a strong tooth. *Racemes* densely panicled, subsessile, hardly longer than the petioles. Possibly a distinct species, the locality being remote from Pegu; but, from Kurz's descriptions, *M. mollis* is a very variable species.

11. **M. muscosa,** *Kurz in Journ. As. Soc. Beng.* 1873, pt. ii. 87; 1877, pt. ii. 220, and *For. Fl.* ii. 100; leaves large obovate, nerves sparingly pilose beneath, racemes rusty-hirsute short densely panicled, bracts prominent.

SOUTH-EAST ASSAM; Nempean, in the Patkoye Mts., *Griffith* (Kew Distrib. n. 3556).

Branches stout, glabrous. *Leaves* 9½ by 5 in., subobtuse, cuspidate, narrowed to the petiole, glabrescent, nerves 11 on each side, slightly denticulate; petiole 1 in. *Panicles* 1½–2 in., exceedingly dense; bracts $\frac{1}{12}$ in., linear, persistent; pedicels very short. *Flowers* very numerous, resembling closely those of *M. mollis*. *Fruit* not seen.

EXCLUDED SPECIES.

M. (BÆOBOTRYS) ACUMINATA, *Wall. Cat.* 2321, is Gymnospora acuminata, *Hook. f.*

2. MYRSINE, *Linn.*

Trees or shrubs. *Leaves* entire or serrate. *Flowers* polygamous or often diœcious, fascicled, axillary or on exceedingly short branches; pedicels short, bracts at their base densely imbricate. *Calyx* small, 4–5-fid, persistent. *Corolla* 4–5-partite, white, segments imbricate or valvate (not contorted) in the bud, recurved. *Stamens* 4–5, filaments short; anthers ovate. *Ovary* free, globose; style cylindric; stigmas 2–5 small, or subcombined, or patent spathulate; ovules several or many. *Fruit* small, globose, dry or fleshy, red or purple. *Seed* solitary, albumen more or less pitted, scarcely ruminate; embryo often curved, horizontal.—Species 80, chiefly tropical.

* *Style 2–4-fid, branches spreading flat spathulate-ovate.*

1. **M. africana,** *Linn.*; *A. DC. Prodr.* viii. 93; branchlets pubescent, leaves subsessile oblong narrowed to the base serrate glabrous, flowers and fruits subsessile. *Lamk. Ill.* t. 122; *Brand. For. Fl.* 286; *Boiss. Fl. Orient.* iv. 31. M. glabra *and* M. scabra, *Gaertn. Fruct.* i. 282, t. 59, fig. 1. M. retusa, *Ait.*; *Vent. Hort. Cels.* t. 86; *Jacq. Hort. Schœnb.* iv. t. 424. M. rotundifolia, *Lamk. Dict.* iv. 194. M. bifaria, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 296, and *Cat.* 2294. M. Potama, *Don Prodr.* 146.

HIMALAYA; from Kashmir and the Salt Range to Nipal, alt. 1–8500 ft., frequent. —DISTRIB. Affghanistan. Africa to the Cape and the Azores.

A shrub or small tree; sometimes 20 ft. *Leaves* (at most) 1¼ by ½ in. *Flowers* in clusters of 3–8, 4- (or 5-)merous, less than $\frac{1}{12}$ in. diam. *Style* branches 2–4 spathulate. *Berry* $\frac{1}{8}$–$\frac{1}{6}$ in. diam.

2. **M. semiserrata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 293; *Tent. Fl. Nep.* t. 24, and *Cat.* 2295; glabrous, leaves petioled lanceolate acute sparingly denticulate or entire, pedicels shorter than the fruits. *A. DC. Prodr.* viii. 93; *Brand. For. Fl.* 285; *Kurz in Journ. As. Soc.* ii. 221, and *For. Fl.* ii 105. M. acuminata, *Royle Ill.* 265; *Madden in Journ. As. Soc.* xvii. pt. i. 368. M. sessilis, *Don Prodr.* 146; *A. DC. l. c.* 104.

NIPAL; *Wallich.* KHASIA, alt. 3–5000 ft., common. BIRMA. *Kurz.*

A shrub or small tree. *Leaves* 3½ by ¾ in., narrowed at both ends, coriaceous;

petiole $\frac{1}{5}$ in. *Pedicels* $\frac{1}{4}$ in., often longer, glabrous. *Flowers* 4- (rarely 5-) merous, $\frac{1}{10}$ in. diam. *Style* with 2-4 spathulate flat branches. *Berry* $\frac{1}{6}$–$\frac{1}{5}$ in. diam.

VAR. *subspinosa*, Don Prodr. 147 (sp.); branches pubescent at the tips, leaves serrate sometimes subspinescent, pedicels glandular-pubescent often when young ferruginous shorter than the fruits.—Gurwhal to Bhotan, alt. 3-9000 ft.; very common, Khasia, *H. f. & T.*—*Branches* often angular. *Leaves* much less coriaceous than in the shining eastern *M. semiserrata*; petiole often pubescent.—This is the common Himalayan *M. semiserrata* of Wallich, though not the plant figured by him (in Tent. Fl. Nep. t. 24). Kurz (who, in his own herbarium, named it *M. bifaria*, Wall.?) nevertheless proposes to call this *M. semiserrata*, and to make a new species (*M. khasiana*, Kurz) of the type which is probably distinct. Kurz "is not sure" about Wallich's figure; it would appear probable that Wallich collected *M. subspinosa* in Nipal and *M. semiserrata* in Khasia, and, regarding them as one species, his figure represents either or both.

** *Style-branches oblong, not spreading.*

3. **M. capitellata,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 295; *Tent. Fl. Nep.* t. 25, and *Cat.* 2296; leaves elliptic-lanceolate narrowed at both ends entire primary veins distinct, flowers subsessile, fruits smooth. *Bot. Mag.* t. 3222; *A. DC. Prodr.* viii. 95; *Brand. For. Fl.* 286; *Kurz in Journ. As. Soc.* 1877, pt. ii. 221. M. excelsa, *Don Prodr.* 147; *A. DC. l. c.* 94. M. lucida, *Wall. Cat.* 2298; *A. DC. l. c.*

NIPAL, *Wallich*; alt. 4000 ft., *J. D. H.* BHOTAN, *Griffith*. ASSAM, *Hamilton*. KHASIA MTS., *H. f. & T.*—DISTRIB. Ava.

A shrub, or a tree 30 ft. *Leaves* 7 by $2\frac{1}{2}$ in., subacute; petiole $\frac{1}{2}$ in. *Flowers* $\frac{1}{6}$ in. across, 5-merous. *Style* cylindric, hardly wider upwards. Bentham (in Fl. Hongk. 205-6) includes (under *M. capitellata*, Wall.) *M. philippensis*, A. DC., and *M. neriifolia*, Sieb. & Zucc.; thus extending the area of the species throughout Eastern Asia to the Philippines and Japan.

VAR. *lanceolata*, Wall. Cat. 2297 (sp.); leaves smaller more coriaceous subobtuse. M. Wightiana, *Wall. Cat.* 2300; *A. DC. l. c.* 94; *Wight Ic.* t. 1211; *Bedd. Fl. Sylv.* t. 234.—Khasia Mts., common. Mts. of South India and Ceylon, common.—There are a number of Malay forms hardly distinguishable, and some of Griffith's examples, collected at Malacca, have the leaves distinctly veined, and cannot be distinguished from var. *lanceolata*.

VAR. *lepidocarpon*, Wight in Herb. (sp.); fruits rough with scales.—Indian Peninsula, *Wight*, n. 1781.—Otherwise as var. *lanceolata*.

VAR. *avenis*, A. DC. in Trans. Linn. Soc. xvii. 107, *and in* DC. Prodr. viii. 96 (sp.); leaves very coriaceous primary nerves obscure, pedicels rather longer sometimes $\frac{1}{3}$–$\frac{1}{2}$ in. *Scheff. Myrsin.* 47; *Kurz in Journ. As. Soc.* 1877, pt. ii. 221, and *For. Fl.* ii. 105. M. Porteriana, *Wall. Cat.* 6525; *A. DC. l. c.* 95. M. umbellulata, A. DC., *l. c.*

Ardisia avenis, *Blume Bijd.* 691. Embelia umbellulata, *Wall. Cat.* 2312.—Birma to Malacca, frequent.—DISTRIB. Sumatra, Java, Banca.—Kurz endeavours to distinguish this specifically by the "stigmas sessile, pedicels thick."

EXCLUDED SPECIES.

M. THEÆFOLIA, *Wall. Cat.* 6391, is Ilex theæfolia, *Hook. f.*

3. EMBELIA, *Burm.*

Shrubs mostly climbing, or small trees. *Leaves* entire or toothed; petiole often margined or glandular. *Racemes* axillary or terminal, simple or compound, or flowers subfascicled; bracts small (except in *E. amentacea*); bracteoles 0. *Flowers* small, polygamous, mostly diœcious, white or greenish yellow. *Calyx* free, 5–4-lobed, persistent. *Petals* 5–4, free or slightly coherent at the base, elliptic, imbricate in bud (in subgenus *Rhynchostylis* contorted). *Stamens* 5–4; filaments more or less adnate to the petal; anthers ovate-oblong. *Ovary* ovoid or globose

(in subgenus *Rhynchostylis* conical-beaked); style cylindric, stigma capitellate; ovules few. *Fruit* small, globose, 1- (rarely 2-) seeded. *Seed* globose, base hollowed, albumen pitted subruminate; embryo curved, transverse.—Species 60; in the tropics of the old world.

In the "Genera Plantarum" (ii. 664) and some other works, the name *Samara*, proposed by Linné in the "Mantissa," is adopted from being assumed to be prior to Burmann's *Embelia*, published in 1768. This was due to the erroneous supposition that *Samara* was proposed in the first part of the "Mantissa," which appeared in 1767; whereas it was proposed in the second, which appeared in 1771. (At p. 1240 of "Genera Plantarum" the error is corrected.

SUBGENUS I. **Euembelia.** *Petals* imbricate in bud. *Ovary* globose or ovoid, not tapering upwards into a beak.

SECT. I. CALISPERMUM, *Lour.* *Flowers* in general 5-merous.

* *Inflorescence both terminal and axillary.* (Leaves entire in the Indian species).

1. **E. Ribes,** *Burm. Fl. Ind.* 62 t. 23; leaves elliptic narrowed at both ends entire glabrous, panicles grey-pubescent, pedicels longer than the flowers and fruits. *Retz. Obs.* iv. 24; *Lamk. Ill.* t. 133; *Roxb. Fl. Ind.* i. 586; *Wall. Cat.* 2304; *A. DC. Prodr.* viii. 85; *Scheff. Myrsin.* 38; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 284; *Kurz For. Fl.* ii. 101. E. garciniæfolia, *Wall.*; *Miq. Pl. Jungh.* 187; *Scheff. l. c.* 40. E. glandulifera. *Wight Ic.* t. 1207; *Dalz. & Gibs. Bomb. Fl.* 137. Calispermum scandens, *Lour. Fl. Cochinc.* 156. Samara Ribes *and* S. floribunda, *in part*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 222.

Throughout INDIA from the Central HIMALAYA to CEYLON and SINGAPORE, alt. 0–5000 ft.; common in the lower hills.—DISTRIB. Malaya and South China.

A scandent shrub. *Leaves* 3 by $1\frac{1}{4}$ in., obtusely acuminate, base cuneate or rhomboid, nerves slender; petiole $\frac{1}{3}$ in. *Panicle-branches* often 3–4 in.; pedicels $\frac{1}{8}$ in. *Flowers* scarcely $\frac{1}{12}$ in. long, white. *Ovary* ovoid, not conic upwards.

2. **E. sessiliflora,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 66, and *For. Fl.* ii. 102; leaves ovate entire glabrous base rounded, panicles grey-pubescent, flowers sessile. Samara sessiliflora, *Kurz in Journ. As. Soc.* 1877, pt. ii. 222.

BIRMA, "probably Martaban or the Karen Hills," *Kurz.*—DISTRIB. Poneshee. Upper Birma.

Only differs from *E. Ribes* in the points stated, and is perhaps a variety of it (*fide* Kurz).

3. **E. microcalyx,** *Kurz in Trimen Journ. Bot.* 1875, 328; leaves elliptic obtuse at both ends entire rusty-villous beneath, panicles villous, pedicels about as long as the flowers. Samara microcalyx, *Kurz. in Journ. As. Soc.* 1877, pt. ii. 221.

NICOBAR ISLANDS; *Kurz.*

A scandent shrub; branches brown-villous. *Leaves* 3 by $1\frac{1}{2}$ in., nearly glabrous above, nerves slender; petiole $\frac{1}{4}$ in. *Panicle-branches* 1 in., dense-flowered. *Flowers* nearly as in *E. Ribes*, but more pubescent.—Differs from *E. canescens*, Jack., by the very obtuse leaves, and elongate compound panicle.

4. **E. coriacea,** *A. DC. in Trans. Linn. Soc.* xvii. 135, and *Prodr.* viii. 87; leaves oblong-lanceolate entire glabrous base obtuse, panicles very compound grey-pubescent, pedicels scarcely so long as the flowers. *Wall. Cat.* 2314. E. oblongata, *Miq. Fl. Ind. Bat. Suppl.* 573. E. macrophylla, *Scheff. Myrsin.* 36.

PENANG; *Wallich.* MALACCA; *Maingay.*—DISTRIB Java, Sumatra.

A scandent shrub. *Leaves* 8 by $1\frac{3}{4}$in. (in Wallich's example, larger in Maingay's),

acute, very coriaceous, nerves slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very stout. *Panicles* often a foot long and broad; bracts at the divisions $\frac{1}{2}$ in., elliptic, sometimes subpersistent. *Flowers* very nearly as in *E. Ribes.*—This has been taken for *E. garciniæfolia*, Wall., which is a somewhat shining Malayan form of *E. Ribes.*

5. **E. adnata,** *Bedd. ms.*; leaves broadly oblong entire glabrous base obtuse, panicle compound branches and pedicels very stout pubescent, pedicels scarcely so long as the flowers. Embelia, sp. 4, *Bedd. For. Man.* 138.

DECCAN PENINSULA; Bolamputty Hills, alt. 5000 ft., *Beddome.*

A large, scandent, epiphytic shrub (Beddome); branches stout, rugose, angular, warted, pubescent towards the tips. *Leaves* 5–6 by 2–2$\frac{1}{4}$ in., obtuse, acute or slightly acuminate, coriaceous, red when young, nerves slender or obscure; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. *Panicle* 8 in. diam., reddish-brown; branches rugose, thinly pubescent. *Flowers* nearly as of *E. Ribes*, the calyx-teeth rather more acute. *Ovary* globose, not conic upwards.—Neither *E. coriacea*, Wall., nor any of the allied Malayan species, has such stout panicle-branches and pedicels.

6. **E. canescens,** *Jack.*; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 292, and *Cat.* 2311; leaves ovate or obovate-oblong narrowed at the apex rounded on the petiole entire, midrib beneath rusty-villous, panicle thin rusty-villous, pedicels as long as the flowers and fruits. *A. DC. Prodr.* viii. 84; *Scheff. Myrsin.* 42.

PENANG; *Jack.* MALACCA; *Maingay.*

A scandent shrub; branches cinnamoneous-tomentose. *Leaves* 3 by 1$\frac{1}{4}$ in., shortly obtusely acuminate, pubescent on both surfaces when young, nearly glabrous except the midrib beneath when old, membranous, nerves prominent; petiole $\frac{1}{4}$ in., glandular. *Panicles* 2–4 in.; pedicels longer than the flowers in Wallich's examples; but Scheffer (Mrysin. 31) diagnoses the species as having pedicels shorter than the flowers and fruits. *Flowers* as in *E. Ribes*, but fulvous-villous; petals hairy on both surfaces. *Fruit* $\frac{1}{5}$ in. long, rather larger than in *E. Ribes.*

7. **E. Limpani,** *Scheff. Myrsin.* 37; leaves oblong subobtuse rusty-villous beneath, panicle rusty-villous, pedicels shorter than the flowers, bracts linear minute. E. villosa, *Wall. Cat.* 2313 *chiefly, not of A. DC.*

MALACCA; *Maingay.*—DISTRIB. Sumatra.

A scandent shrub; branches villous. *Leaves* 2$\frac{1}{4}$ by $\frac{3}{4}$ in., exactly oblong with parallel sides, or slightly wider upwards and obscurely obovate, coriaceous, base rounded; petiole $\frac{1}{5}$ in. *Panicles* compound, 2–5 in. diam., branches 1–4 in.; pedicels 0–$\frac{1}{6}$ in. *Calyx* rusty-pubescent. *Corolla* $\frac{1}{10}$ in. long, puberulous hardly pubescent within and without.—This is probably what Wallich originally meant to be his *E. villosa*, but he described under that name the very different plant mixed with it, which is only a pubescent form probably of *E. robusta*, Roxb.

8. **E. amentacea,** *Clarke*; leaves oblong subobtuse rusty-villous beneath, panicle rusty-villous, pedicels shorter than the flowers, bracts $\frac{1}{4}$ in. ovate-oblong.

MALACCA; *Griffith* (Kew Distrib. n. 3548).

Griffith's examples (marked by him *Samara?*) are young males; the branches of the panicle resembling catkins from the close imbrication of the bracts on all sides. Except as to these bracts, the plant is so exactly like *E. Limpani* that it may prove to be an abnormal form of that species. The flowers, however (males), appear perfectly developed and normal.

** *Inflorescence axillary.*

9. **E. floribunda,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 291, and *Cat.* 2305; leaves long-lanceolate acuminate entire glabrous base obtuse or rounded, racemes panicled glabrous. *A. DC. Prodr.* viii. 85; *Kurz For. Fl.* ii. 102, *in*

part. E. esculenta, *Don Prodr.* 147. Samara floribunda, *Kurz in Journ. As. Soc.* 1877, pt. ii. 222 (*syn. excl.*).

From NIPAL to BHOTAN and TENASSERIM, alt. 2–6000 ft.; frequent.—DISTRIB. Java.

A large, scandent shrub. *Leaves* 8½ by 1–1¼ in., or (above the racemes) sometimes 1½ by ¼ in., much acuminate often caudate, shining, nerves numerous: petiole ¼–½ in. *Racemes* all axillary, usually much divided, often 8 in. *Flowers*, pedicels and fruits much as in *E. Ribes*, but glabrous or very obscurely puberulous.—This has been confounded by Kurz and others, with *E. Ribes*; it has more acuminate leaves much more rounded at the base, and glabrous panicles *never* terminal.

10. **E. robusta,** *Roxb. Hort. Beng.* 16, and *Fl. Ind.* i. 587; leaves obovate-oblong elliptic or obovate suddenly shortly acuminate undulate or obscurely serrulate rusty-pubescent or rarely glabrous beneath reticulated, racemes scarcely divided often fascicled more or less rusty-pubescent. *Wall. Cat.* 2308; *A. DC. Prodr.* viii. 86; *Bedd. For. Man.* 137, and *Anal. Pl.* xix. fig. 2; *Brand. For. Fl.* 284; *Kurz For. Fl.* ii. 102. E.? reticulata, *Wall. Cat.* 6521. E. villosa, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 289, and *Cat.* 2313 *in part*; *A. DC. l. c.* 85. E.? Tsjeriam-Cottam, *A. DC. in Trans. Linn. Soc.* xvii. 131, and *Prodr. l. c.* 87; *Wight Ic.* t. 1209. E.? Basaal, *A. DC. in Trans. Linn. Soc. l. c.* 1, and *Prodr. l. c.* 87; *Dalz. & Gibs. Bomb. Fl.* 136. E. picta, *A. DC. Prodr.* viii. 86. Samara? picta, *Wall. Cat.* 2302. S. robusta, *Kurz in Journ. As. Soc.* 1877, and pt. ii. 222. Ardisia? Basaal *and* Tsjeriam-Cottam, *Roem. & Sch. Syst.* iv. 517, 518.—*Rheede Hort. Mal.* tt. 11, 12.

Throughout INDIA, alt. 0–5000 ft.; from the HIMALAYA (westward to the Jumna, *Brandis*) to CEYLON and TENASSERIM, very common.

A large, rambling shrub, or small tree; branches glabrous. *Leaves* 3¼ by 2 in., sometimes 7 by 3¾ in., base cuneate, margin usually undulate subentire (in a form of East Bengal and Birma regularly somewhat closely toothed), more or less pubescent beneath, or when mature quite glabrous (the type of Roxburgh's plant, much the less common form; see Wallich's note in *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 288); petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Racemes* 1–2 in.; bracts $\frac{1}{10}$ in., linear; pedicels shorter than the flowers and fruits. *Corolla* $\frac{1}{6}$ in. diam., puberulous within and without. *Berry* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., red, nearly dry.

VAR. *ferruginea*, Wall. Cat. 2310 (sp.); branches rusty-tomentose, leaves beneath and racemes rusty-villous or subtomentose. *A. DC. Prodr.* viii. 86.—Pegu and Tenasserim; *Wallich*, &c.—Very different in appearance from Roxburgh's original smooth *E. robusta*, but (as Kurz states) it appears impossible to separate *E. villosa* on the one side from *E. robusta*, on the other from *E. ferruginea*.

11. **E. parviflora,** *Wall. Cat.* 2307; leaves small elliptic or ovate entire rusty-pubescent beneath base rounded, racemes shortened almost to umbels rusty-pubescent. *A. DC. Prodr.* viii. 86; *Scheff. Myrsin.* 44; *Kurz For. Fl.* ii. 104.—Samara parviflora, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223.—Celastrinea, *Griff. Itin. Notes*, 85, n. 1226.

KHASIA MTS., alt. 0–4000 ft.; *Wallich*, *Griffith*, &c.—DISTRIB. Upper Birma, Sumatra.

A scandent shrub; branches rusty-pubescent. *Leaves* ½–1 by ¼–½ in., acute or obtuse; petiole scarcely $\frac{1}{12}$ in. *Pedicels* $\frac{1}{6}$ in., rusty-pubescent, subumbelled on a peduncle $\frac{1}{8}$ in. *Petals* $\frac{1}{12}$ in., oblong, imbricate. *Filaments* slender, three times as long as the anthers. *Berry* $\frac{1}{5}$ in. diam.—Kurz is mistaken in saying that Griffith collected this plant (Kew Distrib. n. 3545) at Ava; Griffith has ticketed it "Lakhat," which is in Khasia nearly due north from Sylhet Station.

SECT. II. SAMARA, *Linn.* *Flowers* in general 4-merous. *Racemes* axillary. *Leaves* entire, or very nearly so. (Choripetalum, *A. DC.*).

12. **E. Myrtillus,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 67, and *For. Fl.* ii. 104; leaves small broadly-elliptic glabrous obtuse base entire, racemes shortened almost to umbels rusty-pubescent. Myrsine Myrtillus, *Hook. Ic. Pl.* t. 825. Samara Myrtillus, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223.

BIRMA; Taondong summit, *Griffith.* MALACCA; Mt. Ophir, *Griffith, Lobb.*—DISTRIB. Philippines.

Exceedingly like *E. parviflora,* except that the leaves are glabrous and prominently dotted beneath, the flowers 4-merous. Kurz guesses it to be a prostrate shrub, but the habit is that of *E. parviflora,* and it is perhaps scandent. The branches are rusty-pubescent, and the inflorescence exactly as that of *E. parviflora,* with which it must be congeneric.

13. **E. Gamblei,** *Kurz ms.*; leaves obovate-oblong or elliptic acute or subobtuse entire glabrous reticulated on both surfaces, fruits $\frac{1}{8}$ in. diam. globose. Samara (Choripetalum) frondosa, *King*; *Gamble Darjeeling list* 52.

SIKKIM; alt. 6–9000 ft., frequent; *Griffith* (Kew Distrib. n. 3544), *J. D. H.*, &c.

A large climber; branches glabrous, or tips rusty-tomentose. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base rounded or cuneate, midrib beneath glabrous or rarely tomentose; petiole $\frac{2}{3}$ in. *Racemes* 1–$1\frac{1}{2}$ in., simple, numerous, usually from the portion of the branches bare of leaves, minutely pubescent or nearly glabrous; pedicels $\frac{1}{8}$ in. *Petals* $\frac{1}{8}$ in., elliptic, obscurely pubescent, imbricate in bud. *Stamens* 4; anthers oblong; not overtopping the petals.—Leaves eaten by the hill-men (J. D. H., J. S. Gamble).

14. **E. Nagushia,** *Don. Prodr.* 147; leaves lanceolate or obovate-lanceolate entire glabrous membranous base narrowed, fruits $\frac{1}{4}$–$\frac{1}{3}$ in. broad depressed-globose. Myrsine? undulata, *Wall. Cat.* 2301. Choripetalum undulatum, *A. DC. Prodr.* viii. 88.

NIPAL; *Wallich.* SIKKIM, alt. 5–10,000 ft.; *J. D. H., Gamble,* &c. KHASIA MTS., *Masters.*

A large climber (Gamble), or a tree 60 ft. high (J. D. H.), or a large erect shrub (Clarke); branches glabrous. *Leaves* 3–6 by 1–2 in., suddenly shortly acuminated or subobtuse; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Racemes* 1 in., simple, usually from the portion of the branches bare of leaves, and appearing with the very young leaves, minutely pubescent or nearly glabrous; pedicels 0–$\frac{1}{8}$ in. *Petals* $\frac{1}{10}$ in., elliptic. *Filaments* 4, not so long as the petals.—Flowers often hermaphrodite. Drupes edible (Don). Acid leaves eaten by the hill-men (J. D. H.).

VAR. *subcoriacea*; leaves subcoriaceous, racemes 2–3 in.—Khasia Mts., *Griffith* (Kew Distrib. n. 3545); Cherra and Surureem, alt. 5–6000 ft., *H. f. & T.*—A lofty climber. *Leaves* 5 by 2 in., obovate-lanceolate, suddenly acuminated or subobtuse, base cuneate or sometimes broadly rhomboid almost rounded. *Fruits* $\frac{1}{3}$ in. broad, depressed-globose, resembling those of *E. Nagushia.* This may be a distinct species.

15. **E. viridiflora,** *Scheff. Myrsin.* 45; leaves coriaceous obovate or oblong entire glabrous base narrowed, fruits $\frac{1}{4}$ in. subglobose rather longer than broad. Choripetalum viridiflorum, *A. DC. Prodr.* viii. 88. C. aurantiacum, *A. DC. l. c.*; *Wight Ic.* t. 1210. Samara Rheedii, *Wight Ic.* t. 1591. S. viridiflora, *Thwaites Enum. Pl. Zeyl.* 173.—*Rheede Hort. Mal.* vii. t. 42.

DECCAN PENINSULA and CEYLON, alt. 2–5000 ft., frequent.—DISTRIB. Malaya.

A large, scandent shrub. *Leaves* 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in. (or smaller oblong), narrowed cuneate at both ends or subobtuse; petiole $\frac{1}{2}$ in. *Racemes* $\frac{1}{2}$–1 in., minutely pubescent or nearly glabrous. *Petals* $\frac{1}{10}$ in., elliptic.—Hardly distinguishable without the fruit from the coriaceous form of *E. Nagushia.*

SUBGENUS II. **Rhynchostylis.** *Petals* twisted in the bud. *Ovary* tapering upwards into a beak. (*Racemes* axillary).

16. **E. vestita,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 288; leaves oblong or ovate narrowed at both ends serrate glabrous, racemes short simple rusty pubescent, petals twisted in the bud. *Wall. Cat.* 2306; *Deless. Ic. Sel.* v. t. 30; *A. DC. Prodr.* viii. 86; *Kurz For. Fl.* ii. 103 *partly*. Samara vestita, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223 *partly*.—Choripetali sp., *Griff. Itin. Notes* 168, n. 162.

NIPAL; *Wallich*. BHOTAN; *Griffith* (Kew Distrib. n. 3547, 3549). ASSAM; Nowgong, *Simons*. KHASIA MTS.; *Griffith*; alt. 4–5000 ft., frequent, *H. f. & T.*, *Clarke*.

A scandent shrub; branches glabrous. *Leaves* 3 by $1\frac{1}{4}$ in., shining base, cuneate or rhomboid, denticulations shallow but sharp, mostly in the upper part of the leaf, nerves conspicuous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous. *Racemes* $\frac{1}{2}$–$1\frac{3}{4}$ in. *Petals* $\frac{1}{10}$ in., oblong, dotted. *Ovary* $\frac{1}{12}$ in., ovoid-conic, beaked. *Berry* globose, $\frac{1}{5}$ in. diam.

17. **E. nutans,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 291, and *Cat.* 2303; leaves oblong subobtusely acuminate pubescent or rusty puberulous on the midrib beneath entire or obscurely bluntly crenulate, base rounded, racemes short simple rusty-pubescent, petals twisted in bud. *A. DC. Prodr.* viii. 87. E. vestita, *Kurz For. Fl.* ii. 103 *partly*. Samara vestita, *Kurz in Journ. As. Soc.* 1877, pt. ii. 223 *partly*.

SILHET; *Wallich, H. f. & T.* KHASIA MTS., alt. 0–5000 ft.; *H. f. & T.* ASSAM; *Griffith, Masters*. PEGU; *Kurz*.

Branches rusty-pubescent, at least towards the tips. *Petioles* rusty-pilose, or pubescent, or ultimately glabrescent. *Racemes* flowers and fruits as in *E. vestita*, with which it is united by Kurz; but there is no difficulty in distinguishing it.

18. **E. Gardneriana,** *Wight Ic.* t. 1208; leaves ovate-lanceolate crenate-serrate beautifully reticulated, racemes shortened almost to fascicles rusty-hairy.

NILGHERRY MTS.; Sisparah, *Gardner*, &c.

A large climber; branchlets rusty-hairy. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in., from ovate to lanceolate, base rounded, rusty-pilose on the midrib beneath or altogether glabrous, shining, coriaceous, nerves much raised on the upper surface; petiole $\frac{1}{4}$ in. *Pedicels* $\frac{1}{6}$–$\frac{1}{4}$ in., subumbellulate from imbricated small bracts. *Petals* $\frac{1}{10}$ in., oblong, dotted. *Ovary* $\frac{1}{10}$ in., ovoid-conic, long beaked. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., globose.—No buds seen, but from the conically beaked ovary it may be inferred that the petals were twisted in bud, and that the species is a near ally of *E. vestita*.

IMPERFECTLY KNOWN SPECIES.

E.? LUCIDA, *Wall. Cat.* 2315; leaves 3 by $1\frac{1}{4}$ in, broadly oblong suddenly narrowed at both ends entire glabrous coriaceous, racemes 1 in. axillary simple solitary or paired rusty-villous. *A. DC. Prodr.* viii. 87.—SINGAPORE, *Wallich*.—Certainly of this genus.

EMBELIA, sp, *Griff. Notul.* iv. 223; leaves ovate-lanceolate glabrous in age subspinosely toothed, panicles axillary and terminal, corolla rotate 5-partite. MOULMEIN; plentiful, *Griffith*.—*Kurz in Journ. As. Soc.* 1877, pt. ii. 223, proposes doubtfully to reduce this to *E. Ribes*; but the subspinously toothed leaves will not allow this.

CHORIPETALUM, *Griff. Ic. Pl. Asiat.* t. 499; branches pubescent, leaves lanceolate acute at both ends entire pubescent, panicles axillary longer than the leaves.—PATKOYE MTS., south-east of Assam; *Griffith*.—Assuming that the branches and leaves are glabrous, this might be *E. floribunda*.

CHORIPETALUM sp., *Griff. Ic. Pl. Asiat.* t. 500; leaves lanceolate acuminate serrate, base cuneate or rhomboid, panicles axillary shorter than the leaves, flowers 4-merous, several 5-merous.—MISHMEE; *Griffith*.

4. **LABISIA,** *Lindl.*

Small shrubs, with a creeping rhizome and short simple stem. *Leaves* lanceolate, acuminate, primary nerves nearly at right angles to the midrib; petiole dilated at the base. *Flowers* small, white, in axillary panicled spikes; bracts very small. *Calyx* 5-toothed. *Corolla* 5-partite; segments ovate, induplicate-valvate in bud. *Stamens* 5, filaments short; anthers oblong-linear. *Ovary* superior, globose; style cylindric, stigma small; ovules few. *Fruit* small, globose, 1-seeded. *Seed* globose, base hollowed, albumen smooth; embryo transverse.—Species 2, Malayan.

1. **L. pothoina,** *Lindl. in Bot. Reg.* 31, t. 48; leaves glabrous or puberulous beneath entire or nearly so, flowers very shortly pedicelled clustered on the rachis of the linear rusty-pubescent panicle. Ardisia pumila, *Blume Bijd.* 688; *A. DC. in Trans. Linn. Soc.* xvii. 135, and *Prodr.* viii. 137; *Scheff. Myrsin.* 92. A.? spicata, *Wall. Cat.* 2273.

MALACCA and SINGAPORE; *Wallich*, &c.—DISTRIB. Sumatra to Borneo.

Stem 6 in. *Leaves* 8 by 2½ in., primary nerves horizontal, very numerous, close; petiole 1–3 in., more or less winged its whole length. *Peduncles* 1–2 in., from 1–3 penultimate axils; spikes 1–4 in. *Petals* $\frac{1}{10}$ in., dotted. *Berry* $\frac{1}{8}$–$\frac{1}{6}$ in. diam.

VAR. *pothoina proper*; petiole winged throughout its length.

VAR. *lanceolata*, Scheff. Myrsin. 93; petiole 2–4 in. not winged, base of leaf narrowed or rounded, pedicels $\frac{1}{8}$–$\frac{1}{6}$ in.—Singapore, *Lobb.* DISTRIB. Sumatra, Borneo.

5. **ARDISIA,** *Swartz.*

Shrubs or small trees. *Leaves* petioled. *Flowers* hermaphrodite, in axillary or terminal, simple or compound umbels or racemes; bracts small, deciduous (except in *A. involucrata*). *Calyx* 5- (rarely 4-) lobed, (sometimes 3-lobed in *A. porosa*), persistent, often somewhat enlarged in fruit. *Corolla* red, white, or spotted, 5-partite; segments acute (in *A. membranacea* emarginate), twisted to the right in bud. *Stamens* 5; filaments very short (except in *A. membranacea*); anthers free, ovate-lanceolate, acute (in *A. membranacea* small, round), (in *A. porosa* opening by terminal pores). *Ovary* globose, narrowed upwards (in *A. membranacea* obovate-oblong); style cylindric, often much longer than the corolla-lobes, stigma punctiform; ovules few. *Fruit* globose or subglobose. *Seed* solitary, globose, albumen pitted or ruminated; embryo horizontal.—Species 200, all tropical.

The Indian species are very uniform in floral structure, except *A. involucrata, membranacea* and *porosa*, which differ possibly generically from all the rest—as much perhaps as do *Pimelandra* and *Amblyanthus*.

* *Panicle terminal, 1–2-divided, branches ending in corymbs often contracted almost to umbels, bracts not leaf-like.*

† *Panicle stout, compound.*

1. **A. crassa,** *Clarke;* leaves narrow-oblong acute at both ends, panicle rusty-pubescent, branches and pedicels exceedingly thick, corolla broad short.

MALACCA; *Maingay.*—DISTRIB. Borneo.

Branches round, stout, ending in a much-flattened panicle. *Leaves* 8½ by 2 in., parallel-sided, subentire, coriaceous, glabrous, primary nerves nearly at right angles to the midrib; petiole ⅓ in. *Panicle* 5 in. (including the peduncle); branches remote, flattened, again divided; pedicels $\frac{1}{6}$–$\frac{1}{8}$ in., umbelled, thickened upwards; bracteoles

$\frac{1}{8}$ in., elliptic, persistent. *Buds* $\frac{1}{5}$ in. long, and as much broad. *Sepals* $\frac{1}{8}$ in., elliptic; in fruit $\frac{1}{5}$ in., orbicular. *Anthers* ovate, acute. *Berry* $\frac{1}{4}$ in. wide, depressed-globose, not striated.—This is perhaps *A. eximia*, Miq. (Pl. Jungh. i. 196) which has subsessile flowers and very large leaves; or the allied *A. jambosioides*, Miq. (not seen).

2. **A. lanceolata,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 275; leaves narrowly obovate-lanceolate, panicle glabrescent once divided into laxly corymbose branches, corolla large. *Wall. Cat.* 2292; *A. DC. Prodr.* viii. 126. A. speciosa, *Blume Bijd.* 684; *A. DC. l. c.* 133; *Miq. Pl. Jungh.* i. 197, and *Fl. Ind. Bat.* ii. 1022; *Scheff. Myrsin.* 88. A. purpurea, *Reinw.*; *Blume Bijd.* 684; *A. DC. l. c.* 129; *Miq. in Pl. Jungh.* i. 197; *Scheff. l. c.* 88. A. mucronata, *Blume l. c.* 685; *A. DC. l. c.* 126; *Scheff. l. c.* 83. A. Leschenaultii, *A. DC. l. c.* 137; *Miq. Pl. Jungh.* i. 197, and *Fl. Ind. Bat.* ii. 1022; *Scheff. l. c.* 89. A. Boissieri, *A. DC. l. c.* 129. A. Hasseltii, *Blume*; *Scheff. l. c.* 86.

PENANG; *Roxburgh.* MALACCA; *Griffith* (Kew Distrib. n. 3569, 3579). SINGAPORE; *McNair.*—DISTRIB. Throughout Malaya to the Philippines.

A large shrub, glabrous or nearly so; branches cylindric. *Leaves* $8\frac{1}{2}$ by $2\frac{1}{2}$ in., shortly acuminate, subentire, coriaceous, primary nerves oblique; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Panicle* 4–5 in., broadly ovate, terminal (rarely axillary compound large and bractless); branches 2–4 in., rarely again divided; pedicels $\frac{3}{4}$–$1\frac{1}{4}$ in., scattered corymbosely on the branches; bracteoles small, obtuse, caducous. *Buds* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$ in., rose-red. *Sepals* $\frac{1}{6}$ in., orbicular, glabrous or nearly so; margins more or less scarious and fimbriate subpubescent; in fruit enlarged, more or less patent in the dried examples. *Berry* $\frac{1}{4}$ in. wide, globose, slightly depressed, not striated.

3. **A. rigida,** *Kurz in Journ. As. Soc. Beng.* 1873, pt. ii. 87, and *For. Fl.* ii. 107; leaves elliptic acute at both ends, panicle glabrescent 1–2-divided, pedicels short, flowers rather small.

TENASSERIM; seashore of the Peninsula, *Helfer* (Kew Distrib. n. 3563).

Branches moderately stout, cylindric. *Leaves* 6 by $2\frac{1}{2}$ in., subentire, glabrous, coriaceous, primary nerves oblique; petiole $\frac{1}{6}$ in. *Panicle* 4 in.; branches minutely rusty-puberulous; pedicels $\frac{1}{12}$ in., umbelled or clustered; bracteoles minute, caducous. *Calyx-teeth* scarcely $\frac{1}{16}$ in., triangular-ovate, minutely rusty. *Buds* $\frac{1}{5}$ by $\frac{1}{12}$ in. *Berry* very small, but not ripe; calyx not enlarged on the young fruit.

4. **A. paniculata,** *Roxb. Hort. Beng.* 16, and *Fl. Ind. ed. Carey & Wall.* ii. 270; glabrous, leaves obovate-lanceolate, panicle large compound, pedicels $\frac{1}{4}$ in. densely umbelled, calyx-lobes small round. *Wall. Cat.* 2268; *Bot. Reg.* t. 638; *Bot. Mag.* t. 2364; *A. DC. Prodr.* viii. 126; *Kurz in Journ. As. Soc.* 1877, pt. ii. 224, and *For. Fl.* ii. 107 (syn. excl.).

KHASIA MTS.; *Griffith* (Kew Distrib. n. 3573). DACCA; frequent, *C. B. Clarke.* CHITTAGONG HILLS; *Roxburgh, Clarke.*

A large shrub; branches more or less compressed. *Leaves* 9 by 3 in., shortly acute, tapering nearly to the base, subentire, coriaceous, primary nerves manifest, oblique; petiole very short and thick. *Panicle* 6–10 in.; branches more or less flattened, again divided; bracts often $\frac{1}{2}$ in., linear-oblong. *Buds* $\frac{1}{5}$ by $\frac{1}{6}$ in., rose-red. *Berry* $\frac{1}{5}$ in., globose, vertically striate.

VAR. *Hookeri*; leaves large, panicle lax compound, pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. Ardisia sp., n. 21, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 1–3000 ft.; Chela, Nowgong, Luckhipoor, *H. f. & T.* Assam; *Masters.*—*Leaves* 14 by 5 in. (in some examples 20 in.). *Panicle* 13 in.; pedicels 2–4-fascicled and also scattered corymbosely.

5. **A. missionis,** *Wall. Cat.* 6524; glabrous, leaves narrowly oblong obtuse narrowed at both ends, panicle large compound, pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *A. DC. Prodr.* viii. 130.

CEYLON; common.

Leaves 5 by 1 in., very coriaceous, primary nerves obscure.—Very close to *A.*

paniculata, Roxb. and treated as a form of it in *Thwaites Enum. Pl. Zeyl.* 173. The numerous Ceylon specimens are, however, all alike, and all differ similarly from *A. paniculata.*

6. **A. courtallensis,** *Wight Ic.* t. 1215; glabrous, leaves obovate-lanceolate, panicle compound lax, pedicels 1 in.

SOUTH DECCAN PENINSULA; Coimbatore and Courtallum, *Wight.*

This again is considered a form of *A. paniculata* by Thwaites (*Enum. Pl. Zeyl.* 173), and by Beddome (*For. Man.* 138), but the exceedingly long pedicels differ considerably. *A. paniculata, missionis* and *courtallensis* are strictly localised forms, whether they be considered species or varieties.

7. **A. colorata,** *Roxb. Hort. Beng.* 16, and *Fl. Ind. ed. Carey & Wall.* ii. 271; leaves petioled narrowly oblong acute at both ends, primary nerves nearly at right angles to the midrib, panicle compound glabrous or obscurely rusty, buds $\frac{1}{8}$ in. long. A. pyramidalis, *Roth Nov. Sp.* 123 (not of Cav.). A. anceps, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 280, and *Cat.* 2261; *A. DC. Prodr.* viii. 126; *Kurz in Journ. As. Soc.* 1877, pt. ii. 224, and *For. Fl.* ii. 107. A. polycarpa, *Wall. Cat.* 2285. A. grandiflora, *Wall. Cat.* 2272. A. Rothii, *A. DC. l.c.* 126. A. Blumii, *A. DC. in Trans. Linn. Soc.* xvii. 117, and *Prodr.* viii. 128, fide *Scheff. Myrsin.* 77. A. ovata, *Thunb.*; *Roem. & Sch. Syst.* iv. 517 (?).

From ASSAM and CACHAR to MALACCA, frequent; *Wallich,* &c. DISTRIB. Malaya, Birma.

A shrub, or tree attaining 25 ft.; branches round, becoming flattened only close under the panicle. *Leaves* 9 by $2\frac{1}{4}$ in., parallel-sided, glabrous, coriaceous; base cuneate; petiole $\frac{1}{3}$ in. *Panicle* 6–12 in., divided 2 or 3 times; branches flattened; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in., densely umbelled, glabrous or minutely puberulous. *Calyx-teeth* $\frac{1}{16}$ in., elliptic-oblong. *Style* $\frac{1}{4}$ in., longer than the corolla. *Berry* $\frac{1}{5}$ in., globose, smooth, deep-red to black.

VAR. *polyneura,* Miq. in Pl. Jungh. i. 198 (sp.); leaves wider, panicle subtriangular wide at the base. *Scheff. Myrsin.* 81.—Malacca, *Griffith.*—DISTRIB. Java.—Leaves $10\frac{1}{2}$ by 4 in., elliptic or somewhat obovate.—Griffith's example in Herb. Wight is identical with the Javan *A. polyneura,* but there are other Malacca examples intermediate between this form and *A. colorata* type. Blume placed these under his *A. sanguinolenta.*

VAR. *complanata,* Wall. Cat. 2277 (sp.); panicles smaller rusty, flowers rather smaller. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 280; *A. DC. Prodr.* viii. 126; *Scheff. Myrsin.* 78. A. sanguinolenta, *Blume Bijd.* 685, *not of Wall.* A. Zollingeri, *A. DC. l.c.* 670.—Chittagong; *H. f. & T.* Penang; *Wallich.*—DISTRIB. Malaya.—Panicle branches often much flattened, densely scaly, hardly pubescent.—Kurz says the berry of his small-flowered *anceps* is white when fully ripe.

†† *Panicle not stout, primary branches often bearing the racemes or umbels.*

§ *Leaves distinctly toothed.*

8. **A. zeylanica,** *Clarke*; leaves broad-lanceolate acute at both ends closely toothed, panicle simple or very sparingly compound, pedicels umbelled minutely rusty. A. divergens var. β crispa, *Thwaites Enum. Pl. Zeyl.* 174.

CEYLON; *Gardner, Wight.*

Leaves $4\frac{1}{2}$ by $1\frac{1}{2}$ in., glabrous, membranous, drying black; primary nerves arching at some distance from the margin, the interspaces and margin with several rows of large dots; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Panicles* 3 by 2 in., primary branches bearing an umbel each, the lowermost sometimes 2; bracts at the forks not rarely leaf-like, 1 in; pedicels $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{8}$ in., ovate-oblong. *Buds* $\frac{1}{5}$ by $\frac{1}{6}$ in. *Berry* $\frac{1}{5}$ in., globose, obscurely striated vertically.

§§ *Leaves entire or obscurely crenulate.*

9. **A. amplexicaulis,** *Bedd. Ic. Pl. Ind. Or.* t. 170, and *Fl. Sylv. Anal. Pl.* t. 18, fig. 3; leaves short-petioled oblong acuminate base rounded, panicle simple or sparingly compound, pedicels umbelled minutely rusty.

WYNAAD; Tirrihoot Hills, alt. 4000 ft., and TRAVANCORE; *Beddome.*

A shrub. *Leaves* 5 by $1\frac{1}{4}$ in., broadest above the middle, acuminate, glabrous, membranous, primary nerves inarching at a distance from the margin, prominently dotted near the margin; petiole $\frac{1}{16}$–$\frac{1}{5}$ in. *Panicle* flowers and fruits as in *A. zeylanica.*—Though *A. zeylanica* has strongly toothed leaves narrowed to the petiole, it is, perhaps, only a form of *A. amplexicaulis.*

10. **A. divergens,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 275; leaves elliptic or oblong, drying red-brown rhomboid or almost round at the base, panicle subsimple minutely rusty. *Wall. Cat.* 2269; *A. DC. Prodr.* viii. 130. A. punctata, *Jack*; *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 275 (*not of Lindl.*). A. punctulosa, *Dietr. Syn. Pl.* i. 615.

PENANG; *Jack, Maingay.*—DISTRIB. Moluccas.

A small tree, 20 ft.; branchlets slender, cylindric, much divided. *Leaves* $4\frac{1}{2}$ by $1\frac{1}{2}$ in., subobtusely acuminate, glabrous, primary nerves arched, prominently dotted especially near the margin; petiole $\frac{1}{5}$ in. *Panicles* 3 by 2 in.; bracts small or deciduous; pedicels $\frac{1}{8}$–$\frac{1}{3}$ in., subumbelled. *Buds* $\frac{1}{8}$ in., and as much broad. *Calyx-lobes* $\frac{1}{20}$ in., round.—*A. javanica* (A. DC. Prod. viii. 130) only differs by having the branchlets upwards and panicle more rusty-pubescent.

11. **A. Gardneri,** *Clarke*; leaves elliptic or obovate-lanceolate narrowed at both ends drying black, panicle minutely-rusty, pedicels umbelled. A. divergens, *Thwaites Enum. Pl. Zeyl.* 174; *A. DC. Prodr.* viii. 130 *partly.*

CEYLON, frequent; *Gardner, Thwaites, &c.*

Very near *A. divergens* and perhaps the Ceylon form of it. *Leaves* acute at the base. *Calyx-teeth* ovate, subacute, rather larger than in *A. divergens. Flowers* altogether as those of *A. zeylanica* (of which Thwaites reckons it a variety), and of *A. amplexicaulis.*

12. **A. andamanica,** *Kurz For. Fl.* ii. 108, and *in Journ. As. Soc.* 1877, pt. ii. 225; glabrous, leaves narrowly lanceolate base cuneate or rhomboid, panicles thin subsimple, pedicels racemed. A. neriifolia, *A. DC. Prodr.* viii. 127 *partly* (*not of Wall.*).

MALAY PENINSULA, from Mergui to Malacca, frequent; ANDAMAN ISLANDS; *Griffith, Kurz, &c.*

A shrub, 2–4 feet (*Kurz*). *Leaves* 5 by 1–$1\frac{1}{4}$ in., acute, primary nerves not prominent, arching near the margin or not at all, sparsely dotted; petiole $\frac{1}{6}$ in. *Panicles* 4 in., often divaricate or depauperated; bracts 0 or deciduous; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Calyx-lobes* $\frac{1}{16}$ in., round, glabrous. *Corolla* $\frac{1}{6}$ by $\frac{1}{5}$ in.—This is not near *A. oblonga*, A. DC. (as Kurz supposed), but is that form of *A. neriifolia*, A. DC., which is said to have terminal inflorescence, and which in fact specifically differs from the North Bengal *A. neriifolia* of Wallich. A. DC.'s figure (*Trans. Linn. Soc.* xvii. t. 8) represents *A. andamanica*, while most of the description ("panicles lateral peduncles and pedicels somewhat velvety") can apply only to *neriifolia.*

VAR. *effusa*; leaves elliptic acuminate, panicle straggling, pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., buds $\frac{1}{4}$ by $\frac{1}{6}$ in.—Andamans; Port Mouat, *Kurz.*—Kurz has issued this unnamed, as though he supposed it specifically different from his *A. andamanica.*

13. **A. tuberculata,** *Wall. Cat.* 2274; leaves coriaceous elliptic narrowed to both ends, panicles compound glabrous or rusty-scaly, flowers numerous small. *A. DC. in Trans. Linn. Soc.* xvii. 119, and *Prodr.* viii. 130. A. chrysophylloides, *Miq. Fl. Ind. Bat. Suppl.* 574.

MALACCA; *Griffith* (Kew Distrib. n. 3564), *Maingay*. SINGAPORE, *Wallich, Maingay.*

Leaves 5 by $1\frac{3}{4}$ in., primary nerves obscure or numerous, thin; petiole $\frac{1}{4}$ in., often rusty-scaly. *Panicle* 3–6 in.; pedicels $\frac{1}{16}$–$\frac{1}{6}$ in., crowded. *Calyx-lobes* very small, ovate, subglabrous. *Buds* $\frac{1}{12}$–$\frac{1}{8}$ in.

VAR. *ophirensis*; nerves of the leaves beneath prominent somewhat thickened, calyx-lobes elliptic, flowers a little larger.—Mt. Ophir, Malacca.

14. **A. porosa,** *Clarke*; glabrous, leaves oblong narrowed at both ends, panicle of 1–3 elongate lax racemes, anthers opening by terminal pores.

MALACCA; *Griffith* (Kew Distrib. n. 3578); *Maingay*.—DISTRIB. Java.

Branchlets flexuose, almost zigzag, compressed or winged. *Leaves* 5 by $1\frac{1}{2}$ in., cuneate, subacute at both ends, hardly acuminate; primary nerves distinct, ramifying (rather than arching) near the margin; dots 0 or obscure; petiole $\frac{1}{5}$ in. *Panicle* 2–4 in., branches wiry, flexuose, compressed; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in., scattered in racemes 1–3 in. long; bracts and bracteoles 0, or small, caducous. *Flowers* 5–4- rarely 3-merous. *Buds* $\frac{1}{4}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{20}$ in., ovate. *Stamens* 5–4, free; anthers as of *Ardisia* but with round (scarcely elongate) pores at the apex. *Berry* $\frac{1}{5}$ in., globose, dark-purple (Maingay), altogether of *Ardisia*.—The Java plant has broader leaves and a still more reduced panicle.

** *Panicle in appearance terminal, the axis of the branch ending in a reduced leaf or leaves, below which rise one or more peduncles.* (*The panicle is perhaps truly terminal in some of these species.*)

15. **A. depressa,** *Clarke*; glabrous, leaves oblong acute at both ends, panicles slender compound not rising above the leaves, flowers small. A. neriifolia, *Kurz For. Fl.* ii. 108, and *in Journ As. Soc.* 1877, pt. ii. 225 (*not of Wall.*).

SIKKIM, alt. 4–6000 ft., *J. D. H.*, KHASIA MTS., *Griffith, Wallich.* ASSAM PLAINS, *Herb. Roxburgh.* BIRMA, *Griffith* (Kew Distrib. n. 3581).

A large bush. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., acuminate, primary nerves close fine, dots most minute; petiole $\frac{1}{6}$ in. *Panicles* 2–3 in.; peduncles bearing as it were small compound umbels; bracts and bracteoles 0 or caducous. *Buds* $\frac{1}{8}$ in. long, and as much broad. *Flowers* rose-coloured (Griffith). *Calyx-teeth* $\frac{1}{16}$ in., lanceolate, acute. *Berry* $\frac{1}{6}$ in., globose, not striate.—This is *A. pedunculata* in Herb. Roxburgh, and was mixed with *A. pedunculosa* in Herb. Wallich; and (perhaps from the small flowers) has been called *A. pauciflora*, Heyne ?.

16. **A. neriifolia,** *Wall. Cat.* 2278; leaves elongate narrow obovate-lanceolate acute entire, panicles minutely-rusty, berry globose-pentagonal scarcely depressed. *A. DC. in Trans. Linn. Soc.* xvii. 118 *partly* (as to description only), (*not of Kurz*). A. floribunda, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 272, and *Cat.* 2263; *A. DC. Prodr.* viii. 127; *Brand. For. Fl.* 287. A. thyrsiflora, *Don Prodr.* 148; *A. DC. l. c.* 138.

SUBTROPICAL HIMALAYA, alt. 5000 ft.; from Kumaon to Bhotan, frequent. KHASIA MTS., alt. 4000 ft., frequent.

A large shrub, common by rivers, with erect branches topped by the pink flowers, and reminding altogether of Oleander. *Leaves* 7 by $1\frac{1}{4}$ in., attenuate at the base, nerves obscure; petiole $\frac{1}{3}$ in. *Peduncles* 3–5 in., ascending, springing above the leaves below the terminal reduced tuft, each supporting often a compound panicle; bracts 0 or caducous; pedicels $\frac{1}{5}$ in., umbelled. *Buds* $\frac{1}{6}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{10}$ in., elliptic, obtuse, minutely rusty. *Berry* $\frac{1}{5}$ in. diam., distinctly pentagonal at least when dry, deep-red.

17. **A. quinquangularis,** *A. DC. in Trans. Linn. Soc.* 2. xvi. 95, and *Prodr.* viii. 127; leaves elongate obovate-lanceolate acute entire, panicles compound rusty-pubescent, berry small pentagonal greatly depressed.

ASSAM.

Leaves and *inflorescence* exceedingly like those of *A. neriifolia. Calyx* pubescent. *Berry* $\frac{1}{10}$ by $\frac{1}{6}$ in., markedly pentagonal, strongly depressed.—The plant here identified (from description only) with *A. quinquangularis*, A. DC., may be a var. of *A. neriifolia*, but the small depressed berry is unlike any of the fruiting examples of that plant. A. DC.'s plant was "obtained by the Ganges or cultivated in the Botanic Garden, Calcutta."

18. **A. pedunculosa,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 279, and *Cat.* 2271 *partly*; glabrous, leaves elongate lanceolate acute, umbels placed racemosely on the peduncles, pedicels long, flowers rather large, *A. DC. Prodr.* viii. 128.

KHASIA MTS., alt. 2–5000 ft., frequent; *Wallich.*

A straggling shrub, with pendent inflorescence. *Leaves* 7 by $1\frac{1}{2}$ in., entire or obscurely toothed, dotted, base cuneate, nerves slender; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Peduncles* 1–4 in., divaricate, sometimes crowded close to the end of the branches, appearing to form a large compound panicle, sometimes axillary or extra-axillary far below the terminal leaves; bracts $\frac{1}{2}$ in., leaf-like, rarely persistent; pedicels $\frac{1}{2}$ in., minutely rusty sometimes when young. *Buds* $\frac{1}{4}$ by $\frac{1}{6}$ in., very acute. *Flowers* rose-red. *Sepals* $\frac{1}{8}$ in., ovate-lanceolate, acute. *Berries* $\frac{1}{5}$ by $\frac{1}{4}$ in., globose, slightly depressed, vertically striate.

19. **A. Griffithii,** *Clarke*; leaves large obovate-oblong acute entire, panicle rusty, pedicels $\frac{1}{4}$ in. umbelled. Ardisia sp. n. 22, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; *Griffith* (Kew Distrib. n. 3576); **Nunklow, alt. 3–5000 ft.,** *H. f & T.*

Habit and inflorescence of *A. neriifolia*, but much stouter, with broad leaves.—*Leaves* 10 by 3 in., narrowed at the base, glabrous, nerves slender; petiole $\frac{2}{3}$ in. *Bracts* (at the base of the umbels) $\frac{1}{8}$ in., elliptic-oblong, unusually persistent. *Sepals* $\frac{1}{8}$ in., elliptic-oblong. *Berries* $\frac{1}{6}$ by $\frac{1}{5}$ in., globose slightly depressed, vertically striated.

20. **A. Icara,** *Ham. in Wall. Cat.* 2264; leaves elongate lanceolate acute crenulate-toothed, panicles rusty, sepals lanceolate acute. *A. DC. in Trans. Linn. Soc.* xvii. 125, t. 7, and *Prodr.* viii. 136. A. serrulata, *Kurz in Journ. As. Soc.* 1873 pt. ii. 87, 1877 pt. ii. 225, and *For. Fl.* ii. 108 (*not of Swartz*).

NORTH-EAST BENGAL; Mudhopoor and Bholagunje, *Hamilton.* ASSAM; Suddiya, *Griffith* (Kew Distrib. n. 3577). BIRMA and TENASSERIM; *Griffith* and *Helfer* (Kew Distrib. n. 3562).

Habit and inflorescence of *A. neriifolia*; from which it only differs by the narrow acute sepals and distinctly crenulate leaves; the berries are hardly pentagonal.

21. **A. Moonii,** *Clarke*; leaves elliptic or obovate coriaceous entire, peduncles few crowded very near the end of the stem long bearing simple panicles, pedicels minutely rusty umbelled. A. Wallichii, *Thwaites Enum. Pl. Zeyl.* 174 (*not of A. DC.*). Anguillaria zeylanica, *Gaertn. Fruct.* i. 173, t. 77, fig. 1.—*Burm. Thes. Zeyl.* t. 103.

CEYLON; *Moon,* &c.

An undershrub $\frac{1}{2}$–2 ft.; young parts obscurely rusty. *Leaves* $6\frac{1}{2}$ by $3\frac{1}{2}$ in., obtuse with a short acumination, base cuneate, dotted, primary nerves distinct beneath; petiole $\frac{1}{4}$ in. *Peduncles* 2–3 in., forming a terminal quasi-umbel; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Buds* $\frac{1}{5}$ by $\frac{1}{6}$ in., pyramidal. *Flowers* rose (Thwaites). *Sepals* $\frac{1}{12}$ in., ovate, subacute. *Berry* $\frac{1}{5}$ in., subglobose, smooth (red, Thwaites).—Easily distinguished from *A. Wallichii* by the entire leaves and quasi-terminal peduncles.

VAR. *subsessilis*; panicles subsessile solitary or several umbelled subterminal.

A. humilis, var., *Thwaites Enum. Pl. Zeyl.* 174.—Ceylon; *Gardner, Thwaites,* n. 2829.—This is, perhaps, distinct from *A. Moonii*, but it can hardly be *A. humilis*; not only is the inflorescence widely different, but the sepals are quite small, not concave with membranous margins on the fruit.

22. **A. macrocarpa,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 277, and *Cat.* 2267; leaves narrowly lanceolate crenulate, umbels subterminal sometimes also from the upper axils and then peduncled, pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *A. DC. Prodr.* viii. 134.

NIPAL; *Wallich.* SIKKIM and BHOTAN; alt. 3–7000 ft., frequent, *J. D. H.*, &c.

A shrub, 1–4 ft. *Leaves* 4–5 by $\frac{1}{4}$ in., acute at both ends, glabrous, membranous, crisped-crenulate with a marginal row of dots; petiole very short or obscured by the long-attenuated base of the leaf. *Peduncles* subterminal and short, or lateral 1–4 in. without leaves or leaf-like bracts at their apex; pedicels minutely rusty. *Calyx-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in., in fruit sometimes $\frac{1}{4}$ in., narrowly oblong. *Petals* exceeding $\frac{1}{4}$ in., lanceolate acute. *Berries* $\frac{1}{2}$–$\frac{1}{3}$ in. wide, globose depressed, bright red, dotted, not vertically striated.—Both A. DC. and Kurz supposed this near *A. crispa*, which has smaller berries and quite different inflorescence, the lateral umbels being sessile, *i.e.* supported by large leaves.

23. **A. virens,** *Kurz For. Fl.* ii. 575, and *in Journ. As. Soc.* 1877, pt. ii. 226; leaves broadly lanceolate acuminate margins crisped-crenulate, peduncles subterminal exceedingly long, pedicels 1 in. Ardisia sp. n. 37, *Herb. Ind. Or. H. f. & T.*

MISHMEE, *Griffith* (Kew Distrib. n. 3561). ASSAM; *Griffith.* KHASIA MTS., alt. 4000 ft., *H. f. & T.*, &c. CACHAR; Doorbund Pass, *Keenan.*—DISTRIB. Yunan.

A small shrub, resembling much *A. macrocarpa.* *Leaves* 7 by 2 in., more acuminate than those of *A. macrocarpa*, and without the marginal row of glands. *Peduncles* 1–2 in., carrying simple or compound glabrous umbels with numerous flowers. *Calyx-lobes* $\frac{1}{8}$ in., elliptic-oblong. *Corolla-lobes* $\frac{1}{4}$ in., ovate, acute, white (Kurz). *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in., globose, smooth, dotted not vertically striated, yellow.

*** *Umbels sessile, simple or compound, terminal, mostly on divaricate branches springing laterally below the end of the main branches.*

24. **A. undulata,** *Clarke*; glabrous, leaves lanceolate acute crenulate, calyx-lobes in fruit narrowly-oblong, berries large. Ardisia sp. n. 41, *Herb. Ind. Or. H. f. & T.* Ardisia sp., n. 953, *Griff. Itin. Notes* 62.

KHASIA MTS.; alt. 250–5000 ft., frequent; *Griffith, H. f. & T.*, &c.

Leaves $5\frac{1}{2}$ by $1\frac{1}{2}$ in., acute at both ends. undulate-crenate, membranous, with prominent glands scattered distantly over the whole surface. *Umbels* simple and compound; pedicels $\frac{1}{2}$–1 in. in fruit. *Buds* $\frac{1}{4}$ in., acute. *Calyx-lobes* $\frac{1}{16}$ in., ovate; in fruit $\frac{1}{8}$ in., oblong. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in., globose, gland-dotted, not vertically striated, altogether as of *A. macrocarpa.*—This is perhaps only a northern form of *A. crenata*, differing by the long acute leaves, and large berry; and was the plant which (under the mistaken name of *A. macrocarpa*) Kurz proposes to merge in *A. crenata.*

25. **A. crenata,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 276; glabrous, leaves elliptic acute or subobtuse crisped-crenate, berries $\frac{1}{5}$ in. diam. globose obscurely vertically striate not dotted. *Wall. Cat.* 2262; *Bot. Mag.* t. 1950. A glandulosa, *Blume Bijd.* 690, *not of Roxb.* A. crenulata, *Lodd. Bot. Cab.* t. 2, *not of Vent.* A. crispa, *A. DC. in Trans. Linn. Soc.* xvii. 124, and *Prodr.* viii. 134 (excl. syn. A. lentiginosa and elegans); *Kurz For. Fl.* ii. 113, and *in Journ. As. Soc.* 1877, pt. ii. 226. A. densa and polysticta, *Miq. Fl. Ind. Bat. Suppl.* 575, 576. Bladhia crispa, *Thunb. Fl. Jap.* 97; *Kaempf. Ic. Pl. Jap.* t. 7.

PENANG, MALACCA, and SINGAPORE, frequent.—DISTRIB. Malaya, China, Japan.

Leaves $3\frac{1}{2}$ by $1\frac{1}{2}$ in., membranous; primary nerves very close together, slender but conspicuous beneath. *Umbels* simple, sometimes proliferous, *i.e.* compound with 1,

rarely 2, lateral secondary umbels, always supported by a leaf (Roxburgh). *Buds* $\frac{1}{4}$ in., ovate, acute. *Flowers* rose or white, often spotted. *Calyx-lobes* (in fruit) $\frac{1}{12}$ in., ovate.

VAR. *angusta*; leaves narrowly lanceolate, flowering pedicels 1 in. divaricate. buds very obtuse, corolla-segments broad.—Malacca; *Griffith* (Kew Distrib. n. 3584).—Leaves 3 by $\frac{1}{2}$ in., tapering at both ends, primary nerves carried almost undivided to the obscure crenatures, whole surface gland-dotted. *Buds* $\frac{1}{6}$ in.

26. **A. Kurzii,** *Clarke*; glabrous, leaves obovate-lanceolate entire reticulated beneath, calyx-segments small obtuse. A. polycephala, var. acuminata, *Kurz For. Fl.* ii. 110, and *in Journ. As. Soc.* 1877, pt. ii. 225.

PEGU and MARTABAN; in the tropical forests, *Kurz.*

Leaves 8 by $2\frac{1}{4}$ in., shortly acuminate, cuneate at the base; primary nerves beneath prominently inarching at some distance from the margin, secondary nerves distinctly reticulated; petioles $\frac{2}{3}$ in. *Umbel* (very young) compounded of 3 umbellules; bracts $\frac{1}{12}$ in., elliptic, deciduous.—Kurz has observed that this is perhaps distinct from *A. polycephala.*

27. **A. villosa,** *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 274; innovations rusty-villous, leaves lanceolate, umbels rusty-villous, calyx-segments $\frac{1}{4}$ in. linear-lanceolate. *Wall. Cat.* 2280; *A. DC. Prodr.* viii. 136; *Scheff. Myrsin.* 90; *Kurz For. Fl.* ii. 113, and *in Journ. As. Soc.* 1877, pt. ii. 227. A. vestita, *Wall. in Roxb. l. c.* in note; *A. DC. l. c.* A. mollis, *Blume Bijd.* 689. A. glabrata, *Blume Bijd.* 692; *A. DC. l. c.* A. Tavoyana, *A. DC. in Trans. Linn. Soc.* xvii. 125.

From MERGUI to MALACCA and PENANG, frequent.—DISTRIB. Malaya.

A small shrub. *Leaves* 6–8 by $\frac{3}{4}$–$2\frac{1}{4}$ in., narrowed at both ends, sparingly crenate or nearly entire, more or less rusty-villous on the lower or on both surfaces; petiole $\frac{1}{3}$ in. *Umbels* simple, or several together, very shortly peduncled; bracts $\frac{1}{8}$–$\frac{1}{6}$ in., elliptic; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., patently villous. *Calyx* subcorolloid, whitish; segments villous without, within glabrous or (in the very hairy forms) hairy. *Corolla* small, hardly so long as the calyx. *Berries* $\frac{1}{4}$ in., globose, shorter than the sepals.—A somewhat variable, though easily recognised species; leaves very broadly lanceolate in some of Griffith's Mergui specimens, linear-lanceolate in Maingay's Malacca ones; often nearly glabrous (in age) except the midrib beneath; more frequently villous beneath; in the form *vestita*, clothed with long fulvous hairs also above.

VAR. ? *obtusa*; leaves obovate-oblong subobtuse, umbels in short shortly-peduncled corymbs.—Shevagherry Hills, South Deccan Peninsula, *Wight.*—Lateral branches divaricate below the summit of the main branch, leafy upwards; terminated by the corymb. Peduncle $\frac{1}{4}$ in.; corymb repeatedly dichotomous; rusty-pubescent; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. Calyx-segments $\frac{1}{6}$ in., ovate-lanceolate.—Perhaps a distinct species, but the solitary example in Herb. Wight is without flowers; it is very like *Hymenandra Wallichii*, but the calyx-teeth are too large for that.

**** *Umbels peduncled or panicled, axillary, the lower (at least) always peduncled without leaves or leaf-like bracts at the apex of the peduncles.*

† *Plant not wholly glabrous, branchlets at least hairy or pubescent.*

‡ *Leaves serrate or crenate.*

28. **A. odontophylla,** *Wall. Cat.* 2279 (*not of Lindl.*); branchlets upwards rusty-villous, leaves long-petioled elliptic sharply finely serrate villous at least on the midrib beneath, peduncles (some of them) remote from the apex of the branch ascending. *A. DC. in Trans. Linn. Soc.* xvii. 125, t. 6, and *Prodr.* viii. 135.

KHASIA and JAINTEA MTS., alt. 1–4000 ft., frequent; *Wallich, H. f. & T.*, &c. PATKOYE MTS., S.E. of ASSAM; *Griffith* (Kew Distrib. n. 3566). CACHAR; *Keenan.*

A weak shrub, 2–6 ft. *Leaves* 6 by 3 in., acute at both ends, usually glabrous or most minutely pubescent except the nerves beneath; petiole 1 in. *Racemes* 1–4 in., simple or compound, lax, few-flowered; bracts small, linear; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., minutely puberulous. *Buds* $\frac{1}{6}$ by $\frac{1}{8}$ in. *Calyx-lobes* $\frac{1}{12}$ in., ovate, obtuse. *Berry* $\frac{1}{4}$ in. diam. (and upwards), globose, not striated, scarlet.

VAR. *Maingayi*; branchlets glabrous, leaves in age glabrous or sparsely pilose on the midrib beneath.—Malacca; *Maingay.*

VAR. *Lobbii*; leaves obovate-lanceolate, base much attenuated, nerves beneath densely villous, peduncles weak pendulous all from near the summit of the branchlets.—Singapore; *Lobb.* n. 316.—Branchlets densely fulvous villous. Peduncles 1–2 in. Buds broader than in *A. odontophylla* type.

29. **A. Brandisiana,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 67, and *For. Fl.* ii. 112; leaves elliptic acute at both ends slightly crenate, peduncles axillary long bearing simple umbels, pedicels 1 in. thickened upwards minutely rusty-pubescent.

MARTABAN; *Brandis.* MOULMEIN; Thoung-gyun, alt. 4500 ft., *Lobb.*

Branchlets thick, rusty and scaly (hardly pubescent) upwards. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{4}$ in., subcoriaceous, nerves distinct; petiole 1 in. *Peduncles* 3–4 in., ascending, minutely rusty; bracteoles very small. *Calyx-lobes* $\frac{1}{8}$ $\frac{1}{6}$ in., ovate, subacute. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., broad, acutely acuminate. *Berry* not seen.

†† *Leaves entire, or very nearly so.*

30. **A. grandifolia,** *A. DC. in Trans. Linn. Soc.* xvii. 122, and *Prodr.* vii. 132; leaves large obovate-oblong acute at both ends glabrous above villous at least on the midrib beneath, peduncles divaricate from near the apex of the branches, calyx-segments $\frac{1}{6}$ in. lanceolate. *Kurz in Journ. As. Soc.* 1877, pt. ii. 225, and *For. Fl.* ii. 111. A. macrophylla, *Wall. Cat.* 2290 (*not of Blume*).

TAVOY; *Wallich.*

Branches rusty-villous. *Leaves* 8 by $2\frac{1}{2}$ in.; primary nerves close together, slender, distinct; petiole $\frac{1}{3}$ in., villous. *Peduncles* 1–2 in., patently pilose, bearing simple umbels; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., very many. *Buds* $\frac{1}{4}$ by $\frac{1}{5}$ in.

VAR. *Parishii*; calyx-segments scarcely $\frac{1}{10}$ in., round.—Moulmein, *Parish*; Mergui, *Griffith* (Kew Distrib. n. 3590).—This may be a distinct species; but the length of the calyx-lobes is very variable in some of the species of *Ardisia,* and the calyx-lobes in Griffith's example are longer than in Parish's.

31. **A. Keenani,** *Clarke*; leaves oblong narrowed at both ends glabrous above rusty-villous beneath, peduncles short bearing simple elongate racemes, calyx-segments very short round glabrous.

CACHAR; *Keenan.* MUNEYPOOR; *Clarke.*

Branches densely brown-villous. *Leaves* 7 by 2 in., primary nerves distinct beneath, somewhat distant, inarching; petiole $\frac{1}{4}$ in. *Peduncles* 1–2 in., patently pilose, on one branchlet divaricate from near its apex, on the other ascending from a lower axil; pedicels $\frac{1}{2}$–1 in., laxly racemose rather than umbelled. *Buds* $\frac{1}{3}$ by $\frac{1}{6}$ in.—This resembles so strongly *A. grandifolia* var. *Parishii,* that it might be added to it as a variety, but the nervation of the leaves differs. The Muneypoor example has much smaller leaves, all the peduncles ascending from lower axils, the racemes more villous, but the calyx-segments glabrous or very nearly so.

32. **A. Helferiana,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 86, and *For. Fl.* ii. 113; densely rusty-villous or woolly, leaves obovate-oblong acute at both ends softly hairy above, peduncles axillary long bearing simple subumbellate racemes.

MERGUI, MOULMEIN, and TENASSERIM; *Griffith, Helfer* (Kew Distrib. n. 3589).

Branches densely rusty-woolly. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{4}$ in., primary nerves strong

petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Peduncles* 3–4 in.; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in.; bracteoles $\frac{1}{4}$ in., linear. *Buds* $\frac{1}{5}$ by $\frac{1}{6}$ in., glabrous. *Calyx* densely villous; segments $\frac{1}{8}$ in., ovate. *Berry* not seen.

33. **A. reflexa,** *Wall. Cat.* 2282; branchlets fulvous-pubescent, leaves narrowly obovate-lanceolate acute at both ends sparingly pilose beneath or glabrescent, peduncles short bearing simple dense minutely fulvous-pubescent racemes. *A. DC. Prodr.* viii. 132. A. Amherstiana, *A. DC. in Trans. Linn. Soc.* xvii. 120, and *DC. l. c.* 131; *Kurz For. Fl.* ii. 111, and *in Journ. As. Soc.* 1877, pt. ii. 225.

PEGU and TENASSERIM; *Wallich*, &c.

Branchlets, corymbs, and innovations with numerous spreading exceedingly short tawny hairs. *Leaves* membranous, 8 by $2\frac{1}{2}$ in. (often smaller), acuminate, base cuneate or rarely suddenly narrowed; primary nerves numerous, slender, thinly pilose beneath, especially near the midrib, or ultimately glabrescent; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Peduncles* 1–2 in., axillary from near the ends of the branches; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in.; bracteoles caducous. *Buds* $\frac{1}{5}$ by $\frac{1}{6}$ in., scarcely acute. *Calyx-segments* $\frac{1}{10}$ in., round. *Berry* $\frac{1}{5}$ in., globose, vertically striate.—In Wallich's Herbarium the type sheet has the leaves pilose beneath, the second sheet has them glabrous; A. DC. made two species of these.

34. **A. khasiana,** *Clarke*; branchlets fulvous-woolly, leaves linear-obovate glabrous, peduncles numerous axillary bearing simple lax few-flowered glabrous umbels. Ardisia sp., n. 27, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 500–3000 ft., frequent; *Griffith* (Kew Distrib. n. 3572), *H. f. & T.*, &c.

Erect, 1–4 ft.; branches very leafy upwards. *Leaves* 4 by $\frac{1}{2}$–$\frac{3}{4}$ in., broadest above the middle, tapering at both ends, primary nerves conspicuous beneath, acutely oblique to the midrib, inarching; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., often woolly. *Peduncles* 1 in., often one from each of the crowded upper axils; pedicels 1 in., usually 2–5 in each umbel. *Buds* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$ in. *Calyx-segments* $\frac{1}{6}$ in., elliptic; in fruit, orbicular, concave, margins membranous. *Berry* $\frac{1}{4}$ in., or more, depressed-globose, scarcely striate.—The flowers, berries, and habit are similar to those of *A. humilis.*

VAR. *Thomsoni*; leaves obovate-lanceolate. Ardisia sp. n. 30, *Herb. Ind. Or. H. f. & T.*—Chittagong; *H. f. & T.* Khasia Mts., alt. 3–4000 ft.; Mousto and Nong Klao, *Clarke*.—*Leaves* 5 by $1\frac{3}{4}$ in. in the Chittagong examples, but connected with *A. khasiana* type by intermediate forms.

†† *Plant wholly glabrous, the young parts sometimes puberulous or scaly.*

‡ *Leaves crenate or denticulate.*

35. **A. membranacea,** *Wall. Cat.* 2288; leaves broadly lanceolate crenate membranous, peduncles axillary slender bearing simple small umbels, corolla-segments obtuse or emarginate, filaments much longer than the small round anthers. *A. DC. Prodr.* viii. 134 (*not of Kurz in Journ. As. Soc.* 1877, pt. ii. 224). Ardisia sp. n. 36, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 2000 ft.; *Wallich, H. f. & T.*, &c. CACHAR; Shapoor, *Keenan.*

Erect, 1–4 ft., subsimple, succulent. *Leaves* 7 by $2\frac{1}{2}$ in., acute at both ends, nerves prominent, gland-dotted all over; petiole $\frac{3}{4}$ in. *Peduncles* 1–2 in.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; bracteoles 0. *Calyx-segments* $\frac{1}{20}$ in., obtuse. *Buds* $\frac{1}{8}$ in., obtuse. *Stamens* inserted close to the base of the corolla-segments, free from each other; filaments linear, flattened, slightly wider upwards; anthers small, round, opening by a longitudinal slit. *Ovary* obovate-oblong, substipitate; style cylindric, short. *Berry* $\frac{1}{4}$ in. diam. and upwards, globose, black, not vertically striate. *Seed* large, very hard at least when dry, altogether of *Ardisia.*—This is the type of a new genus nearly allied to *Amblyanthus,* with which the habit, leaves, inflorescence, and corolla closely agree; the free stamens with long filaments, and the pistil are unlike *Amblyanthus,* and indeed all other Indian Ardisiads.

36. **A. bhotanica,** *Clarke*; leaves large lanceolate crenate, peduncles axillary short rigid bearing umbels arranged in simple panicles, corolla and stamens of *Ardisia.*

BHOTAN; *Griffith* (Kew Distrib. n. 3587).

Leaves 9 by 2½ in., acuminate, prominently nerved, gland-dotted, base cuneate; petiole ½ in. *Peduncles* ½–1 in.; panicles 1½ in. diam.; pedicels ⅛ in. *Buds* ⅛–⅙ by ⅙ in., hardly acute. *Calyx-teeth* $\frac{1}{10}$ in., ovate-lanceolate. *Corolla-segments* subacute. *Stamens* free; filaments very short; anthers oblong lanceolate. *Berry* not seen.

37. **A. Wallichii,** *A. DC. in Trans. Linn. Soc.* xvii. 123, and *Prodr.* viii. 137; leaves obovate-elliptic minutely toothed, peduncles axillary bearing many-flowered subsimple racemes. *Kurz For. Fl.* ii. 122, and *in Journ. As. Soc.* 1877, pt. ii. 226, *in part.* Ardisia sanguinolenta, *Wall. Cat.* 2287 (*not of Blume*). Ardisia sp. n. 31, *Herb. Ind. Or. H. f. & T.*

PROME and RANGOON; *McLelland.* BIRMA; *Griffith* (Kew Distrib. n. 3594).—DISTRIB. Ava.

Closely resembling *A. humilis,* Vahl, from which it differs in the minutely denticulate (not subentire) leaves; and should perhaps be reckoned a Birmese form of that species.—Kurz makes two varieties, whereof 1. *Wallichii proper* has the young shoots and inflorescence with rusty-brown floccose hairs, and 2. *glabriuscula* with the young shoots glabrous, and the pedicels indistinctly puberulous. Kurz's "*Wallichii proper*" is probably therefore the plant above called *A. khasiana var. Thomsoni,* and his var. *glabriuscula* will be Wallich's *A. sanguinolenta.*

‡‡ *Leaves entire or subentire.*

38. **A. involucrata,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 68; leaves obovate-oblong acute at both ends, peduncles lateral and subterminal carrying simple umbels, bracteoles ½ in. ovate concave subpersistent, sepals in fruit ⅓–½ in. Ardisia sp. n. 26, *Herb. Ind. Or. H. f. & T.*

SIKKIM; alt. 2–5000 ft., *Griffith* (Kew Distrib. n. 3560), *J. D. H., Kurz,* &c., not rare.

A shrub, 3–6 ft. *Leaves* 5½ by 2¼ in., shortly acuminate, base attenuate; petiole hardly any. *Peduncles* 1–3 in., stout; pedicels 1 in., usually about 5, bracteoles as many. *Sepals* ¼ in. (in flower), orbicular, concave, waxy corolloid, pink. *Corolla* ⅓ in. long, segments scarcely acute. *Filaments* short; anthers oblong-lanceolate. *Berry* ¼ in., globose, scarcely striate; sepals in fruit spreading at the base, elongate, connivent over the summit of the berry.—This is a very striking species, that has been marked as generically distinct; but it is very nearly allied to *A. humilis.*

39. **A. oxyphylla,** *Wall. Cat.* 2291; leaves elliptic narrowed at both ends, peduncles axillary carrying lax few-flowered racemes, pedicels ¾ in. *A. DC. Prodr.* viii. 130.

PENANG; *Wallich.* TENASSERIM (or Andamans); *Helfer* (Kew Distrib. n. 3571, 3585).

Leaves 7 by 2½ in. (or much smaller), widest at the middle or a little above it, subcoriaceous, nerves numerous distinct; petiole ⅜ in. *Peduncles* 1–3 in., near the apex of the branches or distant therefrom, slender; racemes often shortened, subumbelliform; pedicels 2–6. *Buds* ¼ by ⅙ in. *Calyx-segments* $\frac{1}{10}$ in., ovate, obtuse. *Berry* ¼ in., globose, hardly striate.

VAR. *attenuata,* Wall. Cat. 2286 (sp.); peduncles still more slender. *A. DC. in Trans. Linn. Soc.* xvii. 119, and *Prodr.* viii. 131; *Kurz For. Fl.* ii. 109. A. alternata, *A. DC. in Ann. Sc. Nat.* 2, ii. 296. A. oblonga, *A. DC. in Trans. Linn. Soc.* xvii. 121, and *Prodr. l. c.* 131; *Kurz l. c.* 109, and *in Journ. As. Soc.* 1877, pt. ii. 226.—Pegu, Tenasserim, Andamans. The type sheet of Wall. Cat. 2286 is nearly identical with *A. oxyphylla,* but exhibits neither flower nor berry; the second sheet has smaller leaves, one oblong berry, and is *A. oblonga,* A. DC.

40. **A. polycephala,** *Wall. Cat.* 2293; leaves elliptic or oblong narrowed at both ends, peduncles axillary short stout compressed carrying dense racemes. *A. DC. in Trans. Linn. Soc.* xvii. 118, and *Prodr.* viii. 131; *Kurz For. Fl.* ii. 109, and *in Journ. As. Soc.* 1877, pt. ii. 225 (*excl. var. acuminata*).

PEGU and TENASSERIM; *Wallich, Griffith, Helfer* (Kew Distrib. n. 3565, 3586).
Leaves 7–9 by 2¼ in., nerves numerous, distinct; petiole ¼–⅓ in. *Peduncles* ½–1½ in., often from near the apex of the branches, very much compressed, often recurved or divaricate; pedicels ⅓–½ in., numerous, sometimes subumbelled, sometimes in a raceme 2–4 in. long. *Flowers* nearly as in *A. attenuata*, to which this species is very closely allied; the two differ from their ally *A. humilis* in the elongate leaves and the smaller calyx-segments.

41. **A. rhynchophylla,** *Clarke*; leaves obovate-lanceolate caudate-acuminate, peduncles short bearing simple few-flowered racemes of rather large flowers. Ardisia sp. n. 28, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 3–4000 ft.; Mahadeo and Cherra, *H. f. & T.*
A small, branched shrub. *Leaves* 4½ by 1¼ in., base cuneate, primary nerves prominent beneath, inarching; petiole ⅙ in. *Peduncles* ¼–¾ in.; pedicels 1 in., laxly racemed, much thickened upwards. *Buds* ⅓–¼ by ⅕ in. *Calyx-segments* ⅙–⅕ in., elliptic, concave. *Flowers* white (J. D. H.). *Berry* ¼ in., globose, smooth, gland-dotted, not vertically striate.—Allied to *A. humilis*, differing in the long-acuminate, smaller leaves.

42. **A. Lobbiana,** *Clarke*; leaves small elliptic narrowed at both ends, peduncles axillary bearing umbels in simple panicles.

"INDIA"; *Lobb* (probably Singapore).
Leaves coriaceous, 2¾ by 1¼ in., shortly acuminate, base cuneate; petioles ⅛–⅙ in. *Peduncles* 1 in., distant from the apex of the branches, compressed; panicles 2–3 in. diam., somewhat lax; pedicels ¼–⅓ in., 3–6 in each umbel. *Buds* ¼ by ⅕ in. *Calyx-segments* ⅛ in., ovate, obtuse. *Berry* not seen.—The leaves resemble those of *A. rhynchophylla*, but are shortly acuminate, not caudate.

43. **A. pauciflora,** *Heyne*; *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 279, and *Cat.* 2270; leaves long-lanceolate narrowed at both ends, peduncles short weak axillary bearing 1–5-flowered simple weak racemes. *A. DC. Prodr.* viii. 127 (*excl. var. cymosa*); *Wight Ic.* t. 1214; *Bedd. For. Man.* 138.

MTS. of SOUTH INDIA and CEYLON; common.
Branchlets rusty-scaly, hardly pubescent. *Leaves* 4 by 1 in., or sometimes 9 by 1¾ in., coriaceous, nerves obscure; petiole ⅕ in. *Peduncles* ¼ in., scattered; pedicels ¼ in., thin. *Buds* ⅙ in. long, and as much broad. *Calyx-segments* $\frac{1}{12}$ in., triangular, subacute. *Berry* ⅕ in. diam., globose, not striate.—The Malay *A. cymosa*, Blume, has been reduced to this by A. DC. and Scheffer; but the examples of *A. cymosa* from Java differ considerably, having many-flowered racemes often in panicles, and larger flowers. The peculiarity of *A. pauciflora* is that even stout large-leaved examples have exceedingly small depauperated racemes.

44. **A. rhomboidea,** *Wight Ic.* t. 1213; leaves spathulate-rhomboid obtusely acuminate, peduncles short bearing 1–5-flowered small racemes. *Bedd. For. Man.* 138.

SOUTH DECCAN PENINSULA; Shevagherry Hills, *Wight*.
This is perhaps a form of *A. pauciflora* with abnormal leaves; the branchlets, habit, inflorescence, and berries are as in *A. pauciflora*; the leaves are spathulate with a narrowly winged petiole.

45. **A. humilis,** *Vahl Symb.* iii. 40 (*excl. syn. Burm., not of Blume*); leaves obovate-oblong or elliptic shortly acuminate or subobtuse base cuneate,

peduncles axillary patent or suberect, pedicels stout, calyx-lobes in fruit rounded concave with membranous margins. *A. DC. Prodr.* viii. 129; *Scheff. Myrsin.* 73; *Wight Ic.* t. 1212; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 287; *Kurz For. Fl.* ii. 110, and *in Journ. As. Soc.* 1877, pt. ii. 226. A. solanacea, *Roxb. Cor. Pl.* 27, t. 27, and *Fl. Ind.* i. 580; *Bot. Mag.* t. 1677; *Wall. Cat.* 2283. A. umbellata, *Roth Nov. Sp.* 123; *Roxb. Fl. Ind.* i. 582, and *ed. Carey & Wall.* ii. 273; *Lodd. Bot. Cab.* t. 531. A. litoralis, *Andr. Bot. Rep.* x. 630; *Kurz For. Fl.* ii. 110, and *in Journ. As. Soc.* 1877, pt. ii. 226. A. Wightiana, *Wall. Cat.* 2330. A. polycephala, *Wight Ill.* t. 145 (*not of Wall.*). A. obovata, *Blume Bijd.* 688; *A. DC. Prodr.* viii. 132. A. salicifolia, *A. DC. l. c.* 129. A. elliptica, *Bedd. For. Man.* 138, ? *of Thunb.* A. rostrata, *Hassk. in Flora* 1868, p. 26?. Climacandra obovata *and* multiflora, *Miq. Pl. Jungh.* i. 199, 200. C. littoralis, *Kurz in Journ. As. Soc.* 1871, pt. ii. 68.—*Rheede Hort. Mal.* v. t. 28.

Throughout INDIA, alt. 0–5000 ft.; from the HIMALAYA to CEYLON and SINGAPORE (not in Western and Desert India).—DISTRIB. Malaya, China.

An erect, branched shrub. *Leaves* 6 by 2–2½ in., coriaceous, nerves slender; petiole ¼ in. *Peduncles* 1–2 in., near the apex of the branches or subremote therefrom, divaricate or ascending, sometimes recurved, stout, more or less compressed; umbels simple, sometimes compound, rarely lengthened into racemes; pedicels ½–1 in. *Buds* ⅓ by ⅕ in. *Flowers* pink. *Calyx-lobes* ⅛–⅙ in., elliptic, obtuse; in fruit enlarged, orbicular, closely pressed to the berry. *Berry* ¼–⅓ in. wide, globose, slightly depressed, hardly striate.—Beddome proposes to take up Thunberg's name, *A. elliptica*, for this plant as being the oldest; but the description of *A. elliptica* (see DC. Prodr. viii. 138) is so curt that there can be no certainty that it is *A. humilis*.

VAR. *arborescens*, Wall. Cat. 2289 (sp.); arborescent, leaves large, peduncles long very stout, inflorescence often compound. *A. DC. Prodr.* viii. 131.—Ava; *Wallich*. Wallich's type specimen, however, in no wise differs from some Bengal *A. humilis*, which sometimes attains 25 feet, and has longer leaves and peduncles than in the common shrubby state.

6. PIMELANDRA, *A. DC.*

Flowers in small scattered axillary rusty sessile umbels, racemes or corymbs, otherwise as *Ardisia*.—Species 10; extending from Khasia to Java.

The last section of *Ardisia* only differs from *Pimelandra* in having the lateral inflorescence peduncled. A. DC. depended on the berry being oblong (not globose) as the main character of *Pimelandra*; this character A. DC. took from Wallich. Such obovate-oblong one-sided fruits, with the style-base lateral, are found not rarely both in *P. Wallichii* and *eugeniæfolia*, but are all seedless, and probably due to some insect injury. The perfect fruit in these and all species of *Pimelandra* is globose, exactly as in *Ardisia*.

1. **P. eugeniæfolia,** *Hook. f. in Gen. Pl.* ii. 647; leaves lanceolate-oblong caudate-acuminate crenate nearly glabrous prominently gland-dotted beneath, calyx-lobes minute in fruit. Ardisia eugeniæfolia, *Wall. Cat.* 2276; *A. DC. Prodr.* viii. 130.

KHASIA MTS., alt. 2–4000 ft., frequent; *Wallich, H. f. & T.*, &c.

A shrub, 3–6 ft.; stem erect; branches horizontal, tips rusty-pubescent, with complanate foliage. *Leaves* 10 by 2½ in. in Hooker's examples (usually one-third smaller), base cuneate or rhomboid, glabrous or scarcely villous on the midrib beneath, primary nerves prominent, inarching; petiole ⅕ in., often rusty-pubescent. *Inflorescence* scarcely 1 in. long, usually corymbose, sometimes subsimply racemose, rusty-pubescent; bracts inconspicuous or caducous. *Buds* ⅛ in. *Flowers* altogether of *Ardisia*, but very small. *Calyx-lobes* $\frac{1}{20}$ in. at fruit-time, ovate, subacute, finally deflexed. *Berry* ⅕ in. diam., globose, red, altogether (as is the seed) that of *Ardisia*.—Some of Hooker's specimens bear as many as 45 fruits on each branch, everyone being obovate-oblong

and 1-sided and all seedless, this is also the case in Wallich's type specimens. Clarke's specimens, collected on various occasions, have fruits in abundance, all globose with perfect seeds.

2. **P. Griffithii,** *Clarke*; leaves broadly lanceolate acuminate subentire rusty-villous on the midrib beneath not gland-dotted, calyx-lobes minute. Ardisia eugeniæfolia, *Kurz For. Fl.* ii. 111, and *in Journ. As. Soc.* 1877, pt. ii. 225, *not of Wallich.*

PATKOYE MTS., south-east of Assam, alt. 4000 ft.; *Griffith* (Kew Distrib. n. 3598).

An erect shrub, 4–5 ft.; branches ascending obliquely, rusty-villous at the tips. *Leaves* 6½ by 2 in., base cuneate or rhomboid, primary nerves prominent scarcely inarching, gland-dots most minute; petiole ¼ in. *Inflorescence* less than ¾ in., densely corymbose, rusty-pubescent; flowers as of *P. eugeniæfolia*, but still smaller. *Berry* ⅕ in. diam., globose, red.—Perhaps a var. of *P. eugeniæfolia*; but the erect habit of growth is unlike the marked uniform horizontal branches of that species, and the leaves are without the large glandular dots which are always present in *P. eugeniæfolia.*

3. **P. ? erecta,** *Clarke*; leaves elliptic-oblong narrowed at both ends subentire nearly glabrous, pedicels ⅓ in. in axillary rusty fascicles, calyx-lobes ⅛ in. elliptic-oblong adpressed to the berry.

KHASIA MTS.; Umwai, alt. 3000 ft.; *Clarke.*

A small, erect shrub; branches erect, rusty-villous towards the ends. *Leaves* 4 by 1¼ in., acuminate, base cuneate, primary nerves not prominent, gland-dots scattered not prominent; petiole ⅙ in. *Pedicels* fascicled on shortened lateral spurs, rising from tufts of small bracteoles. *Corolla* small; lobes rounded. *Berry* ⅕ in. diam., globose, smooth.—This is perhaps a new genus; but the examples being in fruit, the stamens have not been observed. The inflorescence resembles that of *Myrsine*, but the fruit is that of *Ardisia.*

4. **P. Wallichii,** *A. DC. in Ann. Sc. Nat.* 2, xvi. 88, and *in DC. Prodr.* viii. 106; leaves large oblong acute at both ends entire rusty-villous at least on the midrib beneath rarely glabrous, pedicels ½ in. in sessile umbels or corymbs, ovary villous, berry ¼–⅓ in. globose glabrous. *Deless. Ic. Sel.* v. t. 31; *Scheff. Myrsin.* 94. Myrsine pachysandra. *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 297, and *Cat.* 2284; *A. DC. in Trans. Linn. Soc.* xvii. 111.

PENANG, MALACCA and SINGAPORE; *Wallich, Griffith, Maingay.*—DISTRIB. Malaya.

A large shrub or small tree; branches rusty-villous at the ends. *Leaves* 9½ by 2¾ in., base cuneate, primary nerves distinct beneath scarcely inarching, dots small or obscure; petioles ¼ in., rusty-villous. *Inflorescence* 1–1½ in., somewhat lax. *Buds* ⅙ by ⅛ in. *Calyx-lobes* $\frac{1}{12}$ in., ovate.

VAR. *Teysmanniana*, Hook. f. in Gen. Pl. ii. 647 (sp.); leaves very large more villous beneath, pedicels very stout. Ardisia Teysmanniana, *Scheff. Obs. Phyt.* ii. 56. Malacca; *Maingay.*—DISTRIB. Bangka.—A. Korthalsiana, *Scheff. Myrsin.* 57, appears the same thing, but is said to differ by the berry (not seen) being hairy.

7. **ANTISTROPHE,** *A. DC.*

Slender shrubs. *Leaves* alternate, petioled, lanceolate, acuminate. *Flowers* hermaphrodite, rose-coloured; umbels subsessile, axillary; pedicels slender; bracts small. *Calyx* small; lobes 5, lanceolate, persistent. *Corolla* deeply 5-fid, lobes twisted to the left in the bud. *Stamens* 5, in the throat of the corolla, filaments short; anthers free, elliptic-oblong, opening by longitudinal slits, connective produced upwards as a membranous wing. *Ovary* ovoid, narrowed into a slender style, stigma punctiform; ovules several, immersed in a globose free placenta. *Berry* globose, smooth; endocarp chartaceous. *Seed*

solitary, stony when dry, globose, albumen ruminated; embryo transverse.—Species 2, Indian.

1. **A. oxyantha,** *A. DC. in Ann. Sc. Nat.* 2, xvi. 84, and *Prodr.* viii. 92; leaves entire glabrous beneath strongly gland-dotted, buds ovate rostrate-acuminate. Ardisia oxyantha, *Wall. Cat.* 2275; *A. DC. in Trans. Linn. Soc.* xvii. 121.

KHASIA, alt. 3–4000 ft.; *Wallich, H. f. & T.*, &c.

Shrub 6 ft. high; branches horizontal, nearly glabrous. *Leaves* 6 by $1\frac{1}{2}$ in., caudate-acuminate, base cuneate, nerves prominent beneath inarching; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Pedicels* $\frac{1}{2}$ in., several or few together, fascicled on exceedingly short lateral spurs. *Buds* $\frac{1}{4}$ by $\frac{1}{6}$ in., somewhat suddenly narrowed into a beak, which encloses the membranous tip of the connectives. *Calyx-teeth* $\frac{1}{12}$ in., puberulous, whitened on the margins. *Berries* $\frac{1}{4}$ in. and upwards, globose, smooth, thinly obscurely vertically striate.

2. **A. serratifolia,** *Hook. f. in Gen. Pl.* ii. 647; leaves regularly closely serrate rusty-villous on the nerves beneath, buds conical acute. Ardisia serratifolia, *Bedd. Ic. Pl. Ind. Or.* t. 113.

ANAMALLAY and COIMBATORE HILLS, ascending to 3000 feet, in moist woods; *Beddome.*

An erect shrub; branches towards their ends (and all the innovations) rusty-villous. *Leaves* $6\frac{1}{2}$ by $1\frac{3}{4}$ in., acute at both ends; nerves prominent beneath, curving much upwards, inarching; gland-dots small or obscure; petiole $\frac{1}{5}$ in. *Pedicels* $\frac{1}{3}$ in., several or few together, minutely rusty-pubescent, fascicled on exceedingly short lateral spurs. *Buds* $\frac{1}{4}$ by $\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{16}$ in., pubescent, whitened on the margins. *Corolla-segments* lanceolate-acuminate, gland-dotted. *Berry* not seen.

8. HYMENANDRA, *A. DC.*

A robust, low shrub. *Leaves* large, obovate-oblong, crenate-dentate. *Umbels* compound, subsessile, terminal on short lateral branches from near the summit of the stem. *Calyx-lobes* 5, ovate, subacute. *Corolla-lobes* 5, long-lanceolate, strongly twisted to the right in bud. *Stamens* 5, attached at the throat of the corolla, filaments very short; anthers ovoid, connectives dilated above the anther and united into a membranous 5-toothed tube. *Ovary* globose, narrowed into a filiform style, stigma punctiform; ovules several, on a globose sessile placenta. *Berry* globose. *Seed* 1, globose, albumen wrinkled; embryo transverse.

H. Wallichii, *A. DC. in Ann. Sc. Nat.* 2. xvi. 83, t. 5, and *Prodr.* viii. 91. Ardisia hymenandra, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 282, and *Pl. As. Rar.* ii. 57, t. 175, and *Cat.* 2266.

KHASIA MTS.; *Wallich*; Mahadeo, alt. 3000 ft., *Griffith.* UPPER ASSAM; *Griffith* (Kew Distrib. n. 3596). CACHAR; Gopal Teela, *Keenan.*

Stem 2–4 ft., erect, stout, usually simple. *Leaves* 10 by 4 in. (or in Griffith's example 24 by 10 in.), acute, scarcely acuminate, base attenuate, sometimes rounded or cordate, glabrous or nearly so, primary nerves slender nearly at right angles to the midrib, gland-dots more or less prominent; petiole scarcely $\frac{1}{4}$ in. Lateral floral *branches* (peduncles) 1–3 in., stout, flattened; bracts $4\frac{1}{2}$ by $\frac{1}{2}$ in., altogether leaf-like, usually 3. *Umbel* usually compound of one subcentral sessile and two lateral peduncled umbellules; pedicels $\frac{3}{4}$ in., very many, rusty-pubescent or ultimately nearly glabrous. *Buds* $\frac{1}{3}$ by $\frac{1}{10}$ in. *Calyx-lobes* $\frac{1}{8}$ in., ovate. *Corolla* red. *Berries* $\frac{1}{5}$ in. diam., globose, scarcely striated.

9. AMBLYANTHUS, *A. DC.*

A small, glabrous shrub. *Leaves* petioled, narrowly lanceolate, slightly crenate-serrate. *Umbels* compound, sessile, terminal on lateral branches leafy at their summits. *Flowers* small; buds obtuse. *Calyx-tube* obconic; lobes 5. *Corolla-lobes* 5, obovate, emarginate, twisted to the right in bud. *Stamens* 5, inserted at the throat of the corolla, filaments short; anthers ovate, united by their margins, dehiscing by slits inwards. *Ovary* oblong, narrowed into a short cylindric style; stigma small, discoid; ovules few, immersed in a globose placenta. *Fruit* not known.

A. glandulosus, *A. DC. in Ann. Sc. Nat.* 2, xvi. 83, t. 6, and *in DC. Prodr.* viii. 91. Ardisia glandulosa, *Roxb. Hort. Beng.* 16, *Fl. Ind. ed. Carey & Wall.* ii. 276; *Wall. Cat.* 2265 (*not of Blume*). A. Roxburghiana, *Dietr. Syn. Pl.* i. 617.

SYLHET; *Wallich.* KHASIA, MTS., alt. 2000 ft.; below Cherra, *H. f. & T.*; Bor Pani, below Nunklow, *J. D. H.*, *Simons.*

Leaves 7 by $1\frac{1}{2}$ in., acuminate, denticulate or entire, base cuneate, primary nerves slender, oblique; petiole $\frac{1}{4}$ in. Flowering *branches* rising obliquely from near the summit of the stem, naked below, peduncle-like, usually with 3–4 leaves near their summit. *Peduncles* 2–3 in., subumbelled, slender, curving; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., numerous, subumbelluled; bracteoles 0 or caducous. *Calyx-lobes* $\frac{1}{16}$ in., ovate. *Corolla-lobes* $\frac{1}{10}$ in., but slightly overlapping in the bud, recurved in flower.

10. ÆGICERAS, *Gaertn.*

A small, glabrous tree; branches cylindric. *Leaves* scattered, petioled, obovate, entire, coriaceous, 1-nerved. *Umbels* sessile, axillary, terminal or leaf-opposed; bracts 0; pedicels filiform. *Flowers* hermaphrodite, white. *Calyx-lobes* 5, imbricate. *Corolla-tube* short; segments 5, acute, twisted to the right in bud. *Stamens* 5, on the corolla-tube; filaments linear, hairy at the base; anthers cordate-lanceolate, dehiscing longitudinally, cells transversely septate. *Ovary* oblong, narrowed into a filiform style, stigma small; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, acute, coriaceous, striated, 1-seeded, at length dehiscing longitudinally. *Seed* conform to the fruit, exalbuminous, germinating within the pericarp; radicle inferior, long, enlarged at the base; cotyledons very short.

Æ. majus, *Gaertn. Fruct.* i. 216, t. 46, fig. 1; *Roxb. Fl. Ind.* iii. 130; *A. DC. in Ann. Sc. Nat.* 2, xvi. t. 9 A, and *in DC. Prodr.* viii. 142; *Wight Ill.* t. 146; *Scheff. Myrsin.* 97; *Dalz. & Gibs. Bomb. Fl.* 137; *Bedd. Fl. Sylv. Anal. Pl.* xix. fig. 3. Æ. fragrans, *Koen. Ann. Bot.* i. 129, t. 3; *Wall. Cat.* 2326; *Wight in Hook. Bot. Misc.* iii. 84, t. 21; *Grab. Cat. Bomb. Pl.* 104; *Griff. Notul.* iv. 294. Æ. obovatum *and* ferreum, *Blume Bijd.* 693. Æ. floridum, *Roem. & Sch. Syst.* iv. 512; *A. DC. in DC. l. c.* 143; *Scheff. l. c.* 99. A. nigricans, *A. Rich. in Voy. Astrol.* ii. 57, t. 21; *A. DC. l. c.* Æ. minus, *A. DC. l. c.* (*not of Gaertn.*). Æ. Malaspinæa, *A. DC. l. c.* Æ. corniculata, *Blanco Fl. Filip.* 79; *Kurz For. Fl.* ii. 114, and *in Journ. As. Soc.* 1879, pt. ii. 227. Rhizophora corniculata, *Linn. Sp. Pl.* 635. R. Ægiceras, *Linn. Syst. Nat. ed. Gmel.* vii. 747. Malaspinæa laurifolia, *Presl. Rel. Haenk.* ii. 68, t. 61.—*Rheede Hort. Mal.* vi. t. 36.

Sea-coasts, from SCINDE to SINGAPORE, especially in the mangrove swamps.—DISTRIB. Tropical shores nearly of the whole world.

A shrub, or tree 15–20 ft. *Leaves* 3 by $1\frac{1}{2}$ in., obtuse, base cuneate; petiole $\frac{1}{5}$ in. *Pedicels* $\frac{1}{2}$ in., numerous. *Calyx-lobes* $\frac{1}{6}$ in., broad, much imbricate, persistent, closely embracing the base of the fruit. *Corolla-lobes* $\frac{1}{4}$ in., almost horny. *Anthers* exserted, versatile. *Fruits* 1–$1\frac{1}{2}$ by $\frac{1}{6}$ in., tapering to an acute apex.

11. **REPTONIA**, *A. DC.*

A small tree, spinous or unarmed; branches hoary. *Leaves* short-petioled, obovate, entire, coriaceous. *Flowers* small, hermaphrodite, axillary, sessile in tufts; bracteoles small. *Calyx-lobes* 5, round, imbricate. *Corolla-tube* short; lobes 5, oblong, obtuse, contorted or imbricate. *Stamens* 5, alternating with 5 lanceolate-subulate staminodes, filaments linear; anthers oblong. *Ovary* hairy, ovoid, narrowed into a cylindric style, stigma small; ovules 5-7, basal, erect, anatropous. *Fruit* globose, fleshy, crowned by the style-base, 1- (rarely 2-) seeded. *Seed* globose, hollowed at the base, albumen ruminated; embryo axile, elongate, curved, cotyledons long, radicle short next the hilum.

R. buxifolia, *A. DC. Prodr.* viii. 153; *Boiss. Fl. Orient.* iv. 32; *Brand. For. Fl.* 287, t. 34. Edgeworthia buxifolia, *Falconer in Proc. Linn. Soc.* i. 129, and *in Trans. Linn. Soc.* xix. 99, t. 9. Edgeworthia sp., *Griff. Notul.* iv. 295, and *Ic. Pl. Asiat.* t. 498. Monotheca muscatensis, *A. DC. l. c.*; *Deless. Ic. Sel.* v. t. 35.

PESHAWUR; *Falconer, Stewart.*—DISTRIB. Affghanistan, Muscat.

Leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in., obtuse, base cuneate, margin recurved, glabrous above, glaucous beneath; petiole hardly $\frac{1}{8}$ in. *Calyx-lobes* less than $\frac{1}{16}$ in., acute, rusty-puberulous. *Corolla* scarcely $\frac{1}{16}$ in., greenish-yellow. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

ORDER LXXXIX. **SAPOTACEÆ.** (By C. B. Clarke.)

Trees or shrubs; young parts often rusty-tomentose. *Leaves* alternate (sub-opposite in *Sarcosperma*), coriaceous, entire, petioled; stipules 0 or very caducous. *Flowers* hermaphrodite, small or medium-sized, axillary; pedicels clustered, rarely solitary (in *Sarcosperma* flowers panicled); bracts and bracteoles 0, or minute. *Calyx-lobes* 4–8, much imbricated, or 2-seriate with the outer series valvate, persistent. *Corolla-tube* shorter than the calyx, lobes as many, or 2–4 times as many as the calyx-lobes. *Stamens* upon the corolla-tube, as many as the corolla-lobes and opposite to them, or 2–3 times as many, 1–3-seriate; filaments usually short; anthers oblong-lanceolate, connective often produced; staminodes, when present, alternating with the stamens. *Ovary* superior, sessile, 2–8-celled; style linear, stigma a point; ovules solitary in each cell, usually attached to the inner angle. *Berry* indehiscent, 1–8-seeded. *Seeds* ellipsoid; or, if more than one, often compressed, hilum long, testa usually crustaceous; embryo straight, exalbuminous with large fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—DISTRIB. Species 320, in the tropics of the whole world.

ACHRAS SAPOTA, *Linn.* (= Mimusops Manilkara, *Don*) is cultivated in India for its fruit.

Fruiting branchlets have been communicated by Mr. Cantley, from Perak, of a tree 80–100 ft. high, which yields gutta plentifully: the 4-merous calyx, fruits, and leaves are as in *Isonandra*, but the single fragment of a flower indicates a funnel-shaped corolla $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; it is attached, and appears to have the remains of many stamens and scales in the corolla-tube. The fragments (not the flowers) are figured by Beauvisage (*Gutta-percha*, t. 2); and the tree is identified by him with *Keratophorus Leerii*, Hassk., erroneously, for in this the corolla is very small. Without fuller material this tree cannot be safely referred to any genus; the pedicels of the fruits are $1\frac{1}{2}$ in. long, scattered towards the ends of the branchlets, not well agreeing with *Isonandra* or *Dichopsis*.

* *Calyx-lobes 1-seriate, imbricated* (*see also* Bassia butyracea), *stamens* 5–6.

Staminodes 0 . . . . 1. CHRYSOPHYLLUM.
Staminodes present, flowers sessile or panicled . . . . 2. SARCOSPERMA.
Staminodes present, pedicels axillary clustered . . . . . . 3. SIDEROXYLON.

** *Calyx-lobes 2-seriate, outer series valvate.*

† *Calyx-segments* 4.

Stamens 8 (in *I. diplostemon* 16) . . . . 4. ISONANDRA.
Stamens 12–40, corolla lobed half way down . . . . 6. BASSIA.
Stamens 12–24, corolla deeply lobed . . . . 7. PAYENA.

†† *Calyx-segments* 6–8.

Staminodes 0 . . . . 5. DICHOPSIS.
Staminodes present . . . . 8. MIMUSOPS.

1. CHRYSOPHYLLUM, *Linn.*

Trees. *Leaves* coriaceous, exstipulate. *Flowers* small, in axillary fascicles. *Calyx-lobes* 5–6, subequal, imbricated. *Corolla-lobes* 5–6, entire, imbricate. *Stamens* 5–6, attached at the base of the corolla-lobes; filaments short, linear; anthers ovate; staminodes 0. *Ovary* 5–6- (rarely 7–10-) celled, villous; style cylindric. *Berry* fleshy, globose. *Seeds* 5–6 (or fewer), testa coriaceous, hilum elongate, albumen copious or scanty.—Species 60; tropical, mostly American; a few in Africa, Asia and Australia.

C. Roxburghii, *G. Don Gen. Syst.* iv. 33; leaves oblong-lanceolate acuminate glabrous, base cuneate, pedicels $\frac{1}{5}$ in., filaments and style short. *A. DC. Prodr.* viii. 162; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 236; *Kurz For. Fl.* ii. 118, and *in Journ. As. Soc.* 1877, pt. ii. 228. C. acuminatum, *Roxb. Fl. Ind.* i. 599; *Wall. Cat.* 4160, *not of Lamk.*

ASSAM; Goalpara, *Hamilton*. KHASIA; Mariao, alt. 3000 ft., *Clarke*. SILHET; *Wallich*. PEGU; *Kurz*. MALACCA; *Griffith, Maingay*.

Attains 40–60 ft. *Leaves* 5 by $1\frac{1}{2}$ in., parallel-sided, the acumination often sudden into a short obtuse tail, shining, primary nerves very numerous and close, nearly horizontal, uniting within the margin; petiole $\frac{1}{5}$ in. *Corolla-lobes* $\frac{1}{12}$ in., obtuse, minutely rusty-pilose. *Corolla-tube* $\frac{1}{16}$ in., filled with rusty hairs; lobes $\frac{1}{16}$ in. *Anthers* included, slits introrse or sublateral. *Style* cylindric, as long as the corolla, obscurely lobed. *Fruit* $1\frac{1}{4}$ in., globose, pulpy, yellow, eaten by the Khasis, when dried strongly 5–6-angled. *Seeds* 5–6, $\frac{1}{2}$ by $\frac{1}{4}$ in., compressed, very hard.

VAR. *sumatrana*, Miq. Fl. Ind. Bat. Suppl. 579 (sp.); leaves rusty-villous on the midrib beneath.—From the Concan southwards and Ceylon, up to 4000 ft. alt.; *Dalzell, Thwaites*, &c.—DISTRIB. Sumatra.

2. SARCOSPERMA, *Hook. f.*

Trees. *Leaves* subopposite, oblong, acuminate, coriaceous; stipules caducous. *Flowers* small, fascicled on the branches of a simple or compound panicle, minutely bracteoled. *Calyx-segments* 5, round, subequal, strongly imbricated. *Corolla-tube* short; lobes 5, round, imbricated. *Stamens* 5, on the corolla-tube; filaments short; anthers oblong, obtuse; staminodes 5, small, oblong-linear. *Ovary* glabrous, 2–1-celled; style cylindric; ovules ascending. *Berry* ellipsoid, large, 2–1-celled, 2–1-seeded. *Testa* crustaceous, hilum nearly basal, albumen 0; embryo fleshy.—Species 3; in North-east India, Birma, Hongkong.

1. **S. arboreum,** *Benth. in Gen. Pl.* ii. 655; leaves large with pits in the axils of the primary nerves beneath, panicle and calyx pubescent-

villous. *Kurz in Journ. As. Soc.* 1877, pt. ii. 229. Sideroxylon arboreum, *Herb. Ham.*—Celastrinea, *Wall. Cat.* 9011. Sapotea, *Griff. Notul.* iv. 291, and *Ic. Pl. Asiat.* t. 501.

SIKKIM and KHASIA, alt. 0–4000 ft.; *Hamilton*, &c. PATKOYE MTS. (in South-east Assam); *Griffith* (Kew Distrib. n. 3603).

A large, bushy tree. *Leaves* 9 by 2 in., parallel-sided, rarely somewhat obovate, suddenly shortly acuminated, base rhomboid, secondary nerves very prominent beneath; petiole $\frac{1}{3}$ in. *Spikes* in panicles 2–8 in.; flowers densely fascicled. *Calyx* $\frac{1}{10}$–$\frac{1}{8}$ in. *Corolla-tube* scarcely $\frac{1}{12}$ in., without hairs within; lobes $\frac{1}{12}$–$\frac{1}{10}$ in. *Fruit* 1 by $\frac{3}{4}$ in., and $\frac{1}{2}$ in. thick; 1-seeded fruits only $\frac{1}{3}$ in. broad, obtuse; calyx-lobes persistent, deflexed.—*Leaves* sometimes somewhat obovate, but never so broad as in Griff. Ic. Pl. Asiat. t. 501, which may represent a different species; for Griffith's Patkoye example (from which this t. 501 is supposed to be taken) has leaves 9 by 2 in., exactly parallel-sided.

2. **S. Griffithii,** *Benth. in Gen. Pl.* ii. 655; leaves lanceolate coriaceous, panicle and calyx glabrous. Sideroxylon sp. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA and JAINTEA MTS., alt. 3–5000 ft.; *Griffith* (Kew Distrib. n. 3602); *H. f. & T.*, &c.

A large tree. *Leaves* 5 by $1\frac{1}{4}$ in., secondary nerves not prominent, no pits in the axils of the leaves beneath. *Inflorescence* nearly as in *S. arboreum*. *Fruit* unknown. —Nearly allied to *S. arboreum*; the leaves are smaller.

3. **SIDEROXYLON,** *Linn.*

Trees. *Leaves* alternate, lanceolate elliptic or obovate, exstipulate. *Flowers* small, in axillary fascicles, subsessile or shortly pedicelled; pedicels pubescent villous or tomentose. *Calyx-segments* 5, much imbricated, subequal. *Corolla-tube* campanulate; lobes 5, imbricated. *Stamens* 5 (perfect), attached to the base of the corolla-lobes, filaments short or linear; anthers ovate or lanceolate; staminodes 5, lanceolate. *Ovary* villous, rarely nearly glabrous, 5- (more rarely 4–2-) celled; style cylindric, short or long. *Berry* ovoid or globose, 5–4- (or 3–1-) seeded. *Seeds* albuminous, usually oblong, much compressed, testa hard, hilum long.—Species 60, tropical, and a few subtropical.

* *Calyx-lobes not acute. Buds obtuse.*

1. **S. grandifolium,** *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* ii. 348, and *Cat.* 4155; branchlets glabrous, leaves obovate-oblong glabrous, pedicels 0–$\frac{1}{6}$ in. minutely pubescent, calyx nearly glabrous. *A. DC. Prodr.* viii. 178; *Kurz For. Fl.* ii. 117, and *in Journ. As. Soc.* 1877, pt. ii. 228. S. regium, *Wall. Cat.* 4156, A.

SILHET; *Wallich*. KHASIA; alt. 3000 ft., below Cherra, *H. f. & T.* PEGU; *Wallich*. MARTABAN; *Kurz*.

A large tree. *Leaves* 10 by $3\frac{1}{2}$ in., acute, tapering at the base, primary nerves strong beneath; petiole 1 in. *Pedicels* densely clustered along the branches below the leaves crowded at their extremities, upon very short spurs. *Calyx-lobes* $\frac{1}{8}$ in., much imbricated, inner pubescent. *Corolla* whitish, hardly longer than the calyx. *Staminodes* lanceolate-linear. *Berry* (*fide* Kurz) globular, size of an apple, smooth, yellow then brown, 5–10-seeded.

2. **S. Maingayi,** *Clarke*; branchlets rusty-pubescent, leaves obovate-oblong shortly acute base tapering nearly glabrous, pedicels 0–$\frac{1}{8}$ in. and calyx closely rusty-pubescent.

MALACCA; *Maingay* (n. 993).

A tree; leaves crowded towards the end of the branches. *Leaves* 6 by $2\frac{1}{2}$ in.,

rusty-pubescent when young, ultimately glabrous or slightly rusty along the midrib beneath, primary nerves 8 each side, prominent; petiole 1 in. *Inflorescence* densely fasciculate, subsessile along the naked part of the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{10}$ in., rounded. *Corolla* little exceeding the calyx. *Staminodes* lanceolate-linear. *Berry* $1\frac{1}{2}$ in. diam., globular, ultimately smooth. *Seeds* 4, $\frac{2}{3}$ by $\frac{1}{3}$ in., compressed, testa hard shining, hilum long.

3. **S. malaccense,** *Clarke*; branchlets rusty subtomentose, leaves broadly obovate obtuse at both ends nearly glabrous, pedicels 0–$\frac{1}{5}$ in. and calyx rusty-villous.

MALACCA; *Maingay* (n. 994).

Leaves crowded towards the ends of the thick branchlets, 7 by $4\frac{1}{4}$ in., very coriaceous, ultimately glabrous, or rusty-tomentose along the midrib beneath; primary nerves 10–11 each side, prominent; petiole $1\frac{1}{2}$–2 in. *Inflorescence* fasciculate, along the naked part of the branches below the terminal leaves. *Calyx-lobes* $\frac{1}{6}$ in., rounded. *Corolla* nearly $\frac{1}{4}$ in. *Staminodes* lanceolate-linear. *Fruit* not seen.—Allied to *S. Maingayi*, differing in the larger flowers and more obtuse leaves.

4. **S. ferrugineum,** *Hook. & Arn. Bot. Beech. Voy.* 266, t. 55; branchlets rusty, leaves oblong-elliptic base attenuate ultimately nearly glabrous, secondary nerves prominent, pedicels $\frac{1}{5}$ in. rusty-pubescent, calyx-lobes scarious-margined nearly glabrous. *A. DC. Prodr.* viii. 178. S. attenuatum, *A. DC. l. c.*; *Wight Ic.* t. 1590; *Kurz For. Fl.* ii. 117, and *in Journ. As. Soc.* 1877, pt. ii. 229. Mimusops? attenuata, *Wall. Cat.* 4150.

MALAY PENINSULA; from Mergui to Singapore, and the ANDAMANS; *Wallich, Griffith*, &c. NICOBARS; *Kurz*.—DISTRIB. Malay Archipelago to the Philippines and S. China.

A small tree. *Leaves* 3 by $1\frac{1}{4}$ in., obtuse or scarcely acute, ferruginous-silky (when young) beneath, coriaceous, shining above; primary nerves 10 on each side, often scarcely more prominent than the secondary; petiole $\frac{1}{2}$ in. *Inflorescence* fascicled in the axils of both persistent and fallen leaves. *Calyx-lobes* $\frac{1}{8}$ in., round. *Corolla-tube* campanulate, sparingly hairy at the base within. *Stamens* (fertile) exserted; filaments linear, longer than the round anthers. *Staminodes* oblong, acute, undulate. *Berry* $\frac{1}{3}$–$\frac{1}{2}$ in., shining, smooth, 1–2-seeded; when 1-seeded obliquely ellipsoid.

5. **S. Hookeri,** *Clarke*; leaves large oblong-lanceolate acuminate, mature glabrous, pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. rusty-villous, calyx-lobes ovate hardly acute. Sideroxylon sp. n. 4, *Herb. Ind. Or. H. f. & T.*

SIKKIM; alt. 6000 ft., *J. D. H.* BHOTAN; alt. 2800 ft., *Griffith* (Kew Distrib. n. 3601).

Branchlets glabrous, tips rusty-villous. *Leaves* $7\frac{1}{2}$ by 2–$2\frac{1}{4}$ in., long-acuminate, base cuneate, young rusty-villous, soon glabrescent; primary nerves 12–15 on each side, prominent; petiole $\frac{3}{4}$ in. *Calyx-lobes* nearly $\frac{1}{6}$ in., villous. *Corolla* $\frac{1}{3}$ in. long and upwards, segments scarcely pubescent without. *Anthers* oblong, acute, exserted. *Staminodes* linear-lanceolate. *Ovary* densely villous. *Fruit* not seen.—This may be a form of the next species which the leaves closely resemble; but the calyx-lobes are blunter, the buds not lanceolate upwards.

** *Calyx-lobes acute. Buds narrow, tips conical.*

6. **S. assamicum,** *Clarke*; leaves broadly lanceolate or elliptic acuminate membranous when mature glabrous or with deciduous sparse floccose tomentum beneath, pedicels $\frac{1}{4}$ in. and calyx densely rusty-villous. S. tomentosum, *Wall. Cat.* 4153 *partly, not of Roxb.*

ASSAM; *Jenkins, Masters.* CACHAR; *Keenan.*

A tree with grey bark (Keenan); branchlets villous. *Leaves* 6 by 2–$2\frac{1}{4}$ in., dark

green, acute, shortly-acuminate, rhomboid at the base, primary nerves 12–15 on each side; petiole $\frac{1}{4}$ in. *Calyx-lobes* $\frac{1}{6}$ in., oblong-lanceolate, villous. *Corolla* $\frac{1}{4}$ in. and upwards, segments acute, nearly glabrous. *Stamens* and staminodes as in *S. tomentosum*. *Fruit* (unripe) 1 by $\frac{1}{3}$ in., acute upwards, glabrescent. This has been supposed a var. of *S. tomentosum*, but the leaves are always acute; none of the numerous examples are spinescent.

7. **S. tomentosum,** *Roxb. Cor. Pl.* 28, t. 28, and *Fl. Ind.* i. 602; leaves elliptic or obovate not acute coriaceous, mature glabrous or tomentose beneath, pedicels $\frac{1}{4}$ in. and calyx densely fulvous-woolly. *Wall. Cat.* 4153, *chiefly*; *Grah. Cat. Bomb. Pl.* 1057; *Kurz For. Fl.* ii. 116, and *in Journ. As. Soc.* 1877, pt. ii. 228. S. armatum, *Roth Nov. Sp.* 138; *Kurz in Journ. As. Soc.* 1877, pt. ii. 228. Sapota tomentosa, *A. DC. Prodr.* viii. 175; *Dalz. & Gibs. Bomb. Fl.* 139. S. armata, *A. DC. l.c.* 176. S. elengoides, *A. DC. l.c.* 177; *Wight Ic.* t. 1218. Achras tomentosa, *Bedd. For. Man.* 142. A. elengoides, *Bedd. Fl. Sylv.* t. 235.

MTS. of MALABAR and CEYLON; from the Concan southwards; common. PEGU and MARTABAN (*fide* Kurz).

A small or moderate-sized tree; branchlets woolly. *Leaves* $1\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{3}{4}$–2 in.; tips obtuse or triangular, base cuneate, primary nerves 10–12 on each side; petiole $\frac{1}{5}$ in. *Calyx-lobes* $\frac{1}{6}$ in., oblong-lanceolate, woolly. *Corolla* $\frac{1}{4}$ in. and upwards, segments acute, nearly glabrous. *Anthers* oblong-lanceolate, exserted; staminodes linear-lanceolate. *Berry* $\frac{3}{4}$–1 by $\frac{1}{2}$–$\frac{2}{3}$ in., ultimately smooth, yellow, 5–4- (or 3–1-) seeded.

IMPERFECTLY KNOWN SPECIES.

8. S. ? GAMBLEI, *Clarke*; leaves elliptic acute, fruit $1\frac{1}{2}$ by $\frac{2}{3}$ in. ellipsoid narrowed upwards 1-seeded. Chrysophyllum sp., *Gamble ms.*

SIKKIM; Rungbee, alt. 5000 ft., *Gamble.*

A tree; shoots minutely rusty-villous. *Leaves* $7\frac{1}{2}$ by $2\frac{3}{4}$ in., acuminate, base rhomboid or broadly cuneate, mature glabrous, glossy beneath; primary nerves 10–12 on each side, much raised beneath, secondary obscure; petiole 1 in. *Pedicels* axillary, fascicled, in fruit $\frac{1}{2}$ in. *Calyx-lobes* 5, (in fruit) $\frac{1}{8}$ in., ovate, obtuse, minutely villous, deflexed. *Corolla* not seen. *Fruit* smooth, symmetric; exocarp fleshy, small; endocarp firm, rather thick, sinuously grooved without. *Seed* conform to the fruit, albumen fleshy, a deep black-blue; embryo small.- Almost certainly belonging to this order; but the genus (while flowers are unknown) is doubtful.

4. ISONANDRA, *Wight.*

Trees. *Leaves* alternate, petioled, coriaceous, glabrous, primary nerves distinct. *Flowers* small, rusty or villous, in axillary clusters, subsessile or shortly pedicelled. *Calyx-segments* 4, subequal, imbricated. *Corolla* deeply 4-lobed, somewhat longer than the calyx. *Stamens* 8, all perfect, attached near the base of the corolla, filaments short; anthers oblong-lanceolate, base sagittate; staminodes 0. *Ovary* villous, 4-celled; style linear. *Berry* ellipsoid, usually 1-seeded, flattened, smooth; pericarp crustaceous. *Testa* hard shining, hilum lateral, albumen fleshy; embryo large, cotyledons elliptic flat.—Species 6, in South India and Ceylon; 1 in the Sandwich Islands.

In the opinion of Thwaites and Beddome, who are well acquainted with this genus in the field, all the Indian species of Wight and A. DC. are varieties of one.

1. **I. villosa,** *Wight Ic.* t. 360; leaves broadly elliptic rounded at both ends glabrous, secondary nerves closely reticulated, flowers sessile on very short thick lateral spurs. *A. DC. Prodr.* viii. 188.

SOUTH DECCAN; Quilon, *Wight.*

Branches thick, obscurely rusty, scarcely pubescent at the tips. *Leaves* $2\frac{3}{4}$ by $1\frac{3}{4}$ in., young glabrous, primary nerves $\frac{1}{5}$ in. apart; petiole $\frac{1}{10}$ in., minutely rusty.

Inflorescence in sessile clusters at the summits of thickly scarred naked spurs 0–¼ in. long. *Calyx-lobes* $\frac{1}{10}$ in., ovate, rounded, minutely sparsely silky or glabrescent upwards. *Berry* ½ by ⅕ in.—The most glabrous species of the genus. In Wight's specimen (figured in Ic. t. 360) the young leaves and shoots are as described above, and no part of the plant is villous. The species seems well distinct by the short petiole, the very rounded leaf-base, the very fine reticulation of the secondary nervation.

2. **I. Candolliana,** *Wight Ic.* t. 1220; leaves elliptic obtuse or scarcely acute, secondary nerves distinct of close subparallel lines, flowers subsessile in the axils of leaves, anther-tips villous. *Dalz. & Gibs. Bomb. Fl.* 139. I. Perottetiana, *A. DC. Prodr.* viii. 188, *partly.*

NILGHERRY MTS.; *Wight, Gardner.*

Shoots minutely rusty-silky. *Leaves* 3½ by 1½ in., not acuminate, base cuneate, margins little recurved when dry, primary nerves ¼–⅓ in. apart; petiole ¼ in. *Flowers* nearly as in *I. villosa*. *Berry* ¾ by ¼ in. Only distinguishable from the next by the hairy anther-tips and more membranous leaves. A. DC. says his *I. Perottetiana* had the anthers pilose at the tips, but Wight split this species into two, whereof his *I. Candolliana* has the anther-tips pilose, his *I. Perottetiana* has them glabrous.

3. **I. Perottetiana,** *Wight Ic.* t. 1219; leaves elliptic obtuse or subacute, secondary nerves obscure of close subparallel lines, flowers subsessile axillary, anther-tips glabrous. *A. DC. Prodr.* viii. 188, *partly.*

NILGHERRY MTS.; *Wight, Gardner, Sir F. Adam.*

4. **I. Stocksii,** *Clarke*; leaves elliptic-obovate obtuse, secondary nerves somewhat laxly reticulated, flowers sessile on very short thick lateral spurs.

CONCAN; *Stocks.*

Branchlets thick. *Leaves* 4½ by 2¼ in., base cuneate, primary nerves ½–¾ in. apart; petiole ⅙ in. *Flowers* as in *I. villosa*.—This, by the leaves clustered at the summits of the branches, and by the inflorescence, approaches *I. villosa*, but the primary and secondary nervation of the leaves is different.

5. **I. lanceolata,** *Wight Ic.* t. 359, *not of Thwaites*; leaves lanceolate obtusely acuminate, secondary nerves distinct subparallel, flowers nearly sessile in the axils of persistent leaves. *A. DC. Prodr.* viii. 187. Sideroxylon Wightianum, *Wall. Cat.* 4154.

SOUTH DECCAN PENINSULA; Coimbatore and Quilon, *Wight*; Nilgherry Mts., *G. Thomson*; Anamallays, *Beddome*. CEYLON; *Dr. Kelaart.*

Branches not thick. *Shoots* minutely rusty-silky, *Leaves* 5 by 1¾ in. (in Wight's type specimen), usually smaller, base cuneate, primary nerves ¼–⅓ in. apart, secondary prominent, slightly waved; petiole ¼ in. *Calyx-lobes* ⅛ in., ovate, obtuse. *Berry* ⅔ by ⅓ in.

VAR. *anfractuosa*; leaves obovate-elliptic abruptly shortly acuminate, secondary nerves conspicuous strongly curved so as to cross each primary at right angles, calyx-segments lanceolate subobtuse.—Cochin; Valla Candoo, *Wight*.—Buds longer than in *I. lanceolata*, of which this appears a fine variety.

6. **I. Wightiana,** *A. DC. Prodr.* viii. 187; leaves elliptic sub-obtuse, primary nerves distant secondary laxly reticulated obscurely subparallel, flowers nearly sessile in the axils of persistent leaves. *Thwaites Enum. Pl. Zeyl.* 177. S. tomentosum, *Wall. Cat.* 4153. Bassia Wightiana, *Bedd. For. Man.* 141.

CEYLON; common, *Wight, Gardner, Thwaites*, &c.

Perhaps not separable from *I. lanceolata*. *Leaves* commonly 3½ by 1½ in., but very variable. The following varieties have been noticed:—

VAR. *major*; leaves 9 by 1¾ in., acuminate, green, primary nerves 1–1¼ in. apart,

secondary nerves subparallel.—*Thwaites* n. 45.—This approaches *I. lanceolata* in the acuminate leaves, but otherwise is not like it. A smaller form of this has the leaves $5\frac{1}{2}$ by $\frac{3}{4}$ in., rostrate.

VAR. *angustata*; leaves $3\frac{1}{2}$ by $\frac{1}{2}$ in. obtuse.—Thwaites nn. 179, 191.

VAR. *acuminata*, Gardn. ms.; leaves broadly obovate-oblong abruptly obtusely acuminate.—This is perhaps near *I. lanceolata* var. *anfractuosa.*

VAR. *montana*, Thwaites Enum. 177; leaves elliptic-obovate obtuse coriaceous, secondary nerves reticulated not subparallel. *Thwaites* n. 3092.—Hardly differs from *I. Wightiana* type.

VAR. *compta*, Thwaites ms.; mature leaves densely silky beneath with rich brown hair.—*Thwaites* n. 3912.

ANOMALOUS SPECIES.

7. I. DIPLOSTEMON, *Clarke*; leaves elliptic-obovate obtuse glabrous, stamens 15–18. —Diospyros obovata, *Wight Ic.* t. 1226.

DECCAN PENINSULA; *Wight.*

Leaves 5 by $2\frac{3}{4}$ in., base obtuse or rounded: petiole $\frac{1}{3}$ in. *Flowers* small, minutely rusty-villose, in axillary fascicles. *Calyx-lobes* 4, $\frac{1}{10}$ in., imbricate. *Corolla-lobes* 5–6. *Stamens* 15–18, 1-seriate, filaments short hairy; anthers lanceolate, acuminate. —Wight's examples are good, but have buds only: these so closely resemble those of *Isonandra* that Beddome (in *For. Man.* 238) considers this species as merely an anomalous state of *Isonandra Wightiana*. The figure of Wight accurately shows the style; there is hardly any trace of a cavity in the ovary, far less of an embryo; but in this respect it agrees with the neighbouring species of *Sapotaceæ* at the same early stage of development: there is no ground for supposing these buds male.

5. DICHOPSIS, *Thwaites.*

Trees; shoots rusty-tomentose. *Leaves* obovate or oblong, petioled, coriaceous. *Flowers* fascicled, axillary, or on the naked branchlets below a terminal tuft of leaves. *Calyx-lobes* 6, 2-seriate, outer 3 valvate, inner 3 imbricate. *Corolla-lobes* 6, imbricated or contorted. *Stamens* 12–18 (usually 12), attached near the base of the corolla, 1-seriate or the alternate a little higher up, filaments short or long; anthers lanceolate, dehiscence extrorse or lateral, connective produced acute or bifid; staminodes 0. *Ovary* villous, 6-celled or (*fide* Thwaites) rarely 4–3-celled; style linear. *Berry* fleshy, ellipsoid or ovoid, 2–1-seeded. *Seed* exalbuminous, testa crustaceous; cotyledons large, fleshy. —Species 30, in S. India, the Malay peninsula and islands; 1 in Samoa.

* *Species of Ceylon.*

1. **D. petiolaris,** *Thwaites Enum.* 176; leaves long-petioled elliptic cuneate at both ends, pedicels 1 in. rusty-tomentose. Bassia petiolaris, *Bedd. For. Man.* 140, and *Fl. Sylv.* t. 254.

CEYLON; Ambagamowa district, Hinidoon and Reigam Corles, *Thwaites.*

A large tree. *Leaves* 4 by 1–3 in., broadly or narrowly elliptic, glabrous, coriaceous, primary nerves distinct oblique, secondary laxly irregularly reticulated, not prominent; petiole $\frac{3}{4}$–$1\frac{1}{4}$ in. *Pedicels* 2–5 together, clustered near the end of the branches. *Calyx-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, subacute, rusty-tomentose. *Corolla* $\frac{2}{3}$ in., white, tube hairy within. *Stamens* 12; filaments short; anthers minutely 2-horned at the apex, 6 opposite the corolla-lobes subextrorse, 6 alternate subintrorse. *Ovary* 6-celled. *Fruit* $1\frac{1}{4}$ in. diam., on erect much thickened pedicels, subspherical, 1-seeded.

2. **D. grandis,** *Benth. in Gen. Pl.* ii. 658; leaves obovate obtuse or abruptly shortly acuminate, pedicels $\frac{1}{2}$–1 in. rusty-tomentose. Isonandra grandis, *Thwaites Enum. Pl. Zeyl.* 176. Bassia grandis, *Bedd. Fl. Sylv.* t. 254.

CEYLON; alt. 6000 feet, *Walker*, &c.

A huge tree. *Leaves* 10 by $4\frac{1}{4}$ in., base cuneate, glabrous; petiole $\frac{3}{4}$ in. *Pedicels*

densely clustered, sometimes near the end of the branches, more often distant therefrom. *Calyx-lobes* $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, subacute, rusty-tomentose. *Corolla* $\frac{2}{3}$ in., white. *Stamens* 12, filaments as long as the anthers; anthers apiculate, extrorse. *Ovary* 6-celled. *Berry* 1–1$\frac{1}{2}$ in., ovoid, black. *Seeds* used for oil.

VAR. *parvifolia*; leaves 2 by 1 in., pedicels $\frac{1}{8}$–$\frac{1}{3}$ in.—There are numerous examples intermediate between this and *D. grandis* type.

3. **D. rubiginosa,** *Benth. in Gen. Pl.* ii. 658; leaves obovate-oblong obtuse rusty-tomentose beneath, pedicels $\frac{3}{4}$–1 in. rusty-tomentose. Isonandra rubiginosa, *Thwaites Enum.* 177. Bassia rubiginosa, *Bedd. For. Man.* 141.

CEYLON; up to 4000 ft., Saffragam district and Hinidoon Corle, *Thwaites.*

A huge tree. *Leaves* 3$\frac{1}{2}$ by 1$\frac{1}{2}$–1$\frac{3}{4}$ in., base cuneate, very coriaceous, ultimately nearly glabrous; petiole $\frac{1}{2}$ in. *Pedicels* 6–10 together, stout, subterminal or lateral. *Calyx-lobes* $\frac{1}{3}$ in. and upwards, ovate, subacute. *Stamens* 12; filaments shorter than the apiculate anthers. *Ovary* 6-celled. *Berry* ovoid.—Flowers rather larger than in the two foregoing species.

4. **D. canaliculata,** *Benth. in Gen. Pl.* ii. 658; leaves oblong shortly cuneate at both ends, pedicels 1 in. hardly crowded sparingly fulvous-tomentose. Isonandra canaliculata, *Thwaites Enum.* 177. Bassia canaliculata, *Bedd. For. Man.* 141.

CEYLON; Caltura district, *Thwaites, Gen. Walker.*

A medium-sized tree. *Leaves* 10 by 4$\frac{1}{4}$ in. to 2$\frac{1}{2}$ by 1$\frac{1}{4}$ in., glabrous, midrib channelled above or nearly plane; petiole $\frac{3}{4}$–2 in. *Pedicels* 2–4 together, lateral or terminal, less crowded than in the three foregoing species. *Calyx-lobes* $\frac{1}{4}$ in., broad-triangular. *Ovary* 6-celled. *Berry* ellipsoid.—The channelling of the midrib of the leaf above, characteristic of Thwaites' large specimens, entirely disappears in some of the small examples.

5. **D. pauciflora,** *Benth. in Gen. Pl.* ii. 658; leaves narrowly elliptic obtusely acuminate, pedicels 0–$\frac{1}{2}$ in. rusty-tomentose. Isonandra pauciflora, *Thwaites Enum. Pl. Zeyl.* 177. Bassia pauciflora, *Bedd. For. Man.* 141.

CEYLON; near Ratnapoora, at no great elevation, *Thwaites.*

A medium-sized tree. *Leaves* 7 by 2$\frac{1}{4}$ in., base cuneate, glabrous, primary nerves distinctly inarching; petiole $\frac{3}{4}$ in. *Calyx-lobes* $\frac{1}{6}$–$\frac{1}{5}$ in., elliptic, rusty-tomentose. *Corolla* $\frac{1}{3}$ in. *Ovary* 3–4-celled. *Berry* oblong.

6. **D. lævifolia,** *Benth. in Gen. Pl.* ii. 658; leaves narrowly obovate-oblong obtuse or subacute, pedicels $\frac{3}{4}$ in. closely pilose. Isonandra lævifolia, *Thwaites Enum.* 177. Bassia lævifolia, *Bedd. For. Man.* 141.

CEYLON; Saffragam district and Reigam Corle, at no great elevation, *Thwaites.*

A medium-sized tree; branchlets adpressedly pilose. *Leaves* 4$\frac{3}{4}$ by 1$\frac{1}{2}$ in., base cuneate, glabrous, very smooth beneath from the primary nerves not being elevated, secondary nerves slender but very distinct; petiole $\frac{1}{2}$ in. *Fascicles* 4–6-fld.; axillary or 1–2 near the ends of the branches. *Calyx-lobes* $\frac{1}{5}$ in., ovate, acute, closely pilose. *Anther-tips* pilose (Thwaites). *Ovary* 6-celled. *Berries* oblong, acute.

7. **D. lanceolata,** *Benth. in Gen. Pl.* ii. 658; young leaves and shoots rusty-tomentose, leaves lanceolate narrowed at both ends tip very obtuse, pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. obscurely tomentose. Isonandra lanceolata, *Thwaites Enum.* 442, *not of Wight.* Bassia lanceolata, *Bedd. For. Man.* 141.

CEYLON; Caltura, *Thwaites.*

A middle-sized tree. *Leaves* 4$\frac{1}{4}$ by 1$\frac{1}{4}$ in., coriaceous, densely closely silky-tomentose beneath when young, glabrescent when mature, nerves obscure; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Pedicels* 3–6 together. *Calyx-lobes* $\frac{1}{4}$ in. or rather more, ovate, subacute, obscurely tomentose.

** *Species of Malabar.*

8. **D. elliptica,** *Benth. in Gen. Pl.* ii. 658; leaves elliptic or somewhat obovate subobtuse glabrous, pedicels 1½ in. minutely tomentose, stamens 12–18 (usually 14–17). Bassia elliptica, *Dalz. in Hook. Kew Journ.* iii. 36; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 43. Bassia sp., *Miq. Pl. Hohenack.* n. 397. Isonandra acuminata, *Drury Useful Pl. Ind.* 260, *not of Gardner.*

BOMBAY and CANARA; *Dalzell.* MANGALORE; *Hohenacker.* CANARA; *Stocks.* WESTERN GHATS, up to 4000 ft.; common, *Beddome.*

A tree, 100 ft., trunk often straight, unbranched to a great height; branchlets and shoots minutely adpressedly pilose. *Leaves* 4 by 2 in., obtuse or with a short obtuse triangular point, base cuneate; petiole ⅔ in. *Pedicels* 4–8 together, axillary or terminal. *Calyx-lobes* ⅕ in., ovate, subacute, minutely adpressed-pilose. *Corolla* ½ in., segments fulvous-silky on the back. *Filaments* short, hairy; anthers narrow-lanceolate, acute, sometimes tips hairy. *Ovary* 6-celled. *Berry* 1½ in., ellipsoid.—Indian Gutta-percha.

*** *Species of East Bengal and the Malay Peninsula.*

9. **D. polyantha,** *Benth. in Gen. Pl.* ii. 658; leaves obovate-oblong subobtuse closely silky-tomentose beneath or mature nearly glabrous, pedicels 1½ in., filaments hairy hardly as long as the anthers. Bassia polyantha, *Wall. Cat.* 4166; *A. DC. Prodr.* viii. 198. Sideroxylon regium, *Wall. Cat.* 4156, *partly.* Isonandra polyantha, *Kurz For. Fl.* ii. 119, and *in Journ. As. Soc.* 1877, pt. ii. 230.

SILHET; *Wallich, H. f. & T.* CACHAR; *Keenan.* CHITTAGONG; *H. f. & T.* PEGU; *Wallich.* ARRACAN; *Kurz.*

A tree, 30–40 ft. *Leaves* 5½ by 2¼ in., base cuneate, silvery or rich brown glossy beneath; petiole ½–1¼ in. *Pedicels* in lax clusters towards the ends of the branches, tomentose. *Calyx-lobes* ¼–⅓ in., ovate, hardly acute. *Corolla* nearly ½ in., cream-coloured. *Stamens* 12, sometimes more. *Berry* 1½ in., obovoid, scaly brown, 1-seeded.—Yields good gutta-percha in large quantity (*Kurz*). Flowers eaten (*Keenan*).

10. **D. obovata,** *Clarke*; leaves obovate-oblong glaucescent glabrous beneath secondary nerves obscure, pedicels ½ in. densely clustered, filaments glabrous at least as long as the anthers. Isonandra obovata, *Griff. Notul.* iv. 293; *Kurz For. Fl.* ii. 120, and *in Journ. As. Soc.* ii. 230. Bassia? hypoleuca, *Miq. Fl. Ind. Bat. Suppl.* 582 (*fide Kurz*).

MALACCA; *Griffith* (Kew Distrib. n. 3606), *Maingay* (n. 985, 996). SINGAPORE; *T. Anderson.*

A tree; branches thick, leaves clustered towards their extremities; shoots rusty-tomentose. *Leaves* 8½ by 3–4 in., obtuse or very shortly acute, base cuneate, primary nerves 12 on each side, much raised beneath; petiole ¾ in. *Clusters* densely covering the branches below the terminal leaves. *Calyx-lobes* ⅕–⅙ in., ovate, subobtuse. *Corolla* ½ in., nearly glabrous without, segments narrow acute. *Stamens* 12. *Berries* ¾ in. diam., globose.—Kurz says that there is another species collected in Martaban by Falconer closely allied to this. The imperfect specimen collected by Falconer at Moulmein appears identical.

11. **D. Helferi,** *Clarke*; leaves obovate-lanceolate obtuse glabrous secondary nerves distinct, pedicels ¾ in. densely clustered.

TENASSERIM; *Helfer* (Kew Distrib. n. 3616). TAVOY; *Packman.*

Closely allied to *D. obovata*; and is perhaps Helfer's Tenasserim plant referred to *D. obovata* by Kurz; but the nervation of the leaves is different. *Leaves* 8½ by 3 in., base cuneate, primary nerves 8–9 on each side, ¾–1 in. apart, inarching not conspicuously parallel.—Corolla not seen.

12. **D. Maingayi,** *Clarke*; leaves large obovate pilose beneath, pedicels ½–¾ in. densely clustered rusty hirsute, filaments glabrous.

MALACCA; *Maingay* (n. 996–2).

Branchlets thick, rusty-villous. *Leaves* 9½ by 6 in., obtuse, base cuneate, primary nerves 13 on each side, carried parallel almost to the margin, secondary distinct; petiole nearly 2 in. *Pedicels* densely clustered along the branches below the terminal leaves. *Calyx-lobes* ⅙ in., ovate, obtuse, rusty hirsute. *Corolla* ¼–⅓ in., nearly glabrous without, lobes ovate acute. *Stamens* 12; filaments about as long as the anthers. *Fruit* not seen.—Nearly allied to *D. obovata*, but the corolla is much shorter with wider lobes, and the indumentum is more spreading.

13. **D. hexandra,** *Clarke*; leaves elliptic-oblong suddenly narrowed at both ends glabrous, pedicels ¼–½ in. clustered axillary, filaments pilose hardly so long as the anthers. Isonandra hexandra, *Griff. Notul.* iv. 292. Payena Griffithii, *Kurz For. Fl.* ii. 121, and *in Journ. As. Soc.* 1877, pt. ii. 230?.

MALACCA; *Griffith* (Kew Distrib, n. 3609), *Maingay* (n. 984).

Shoots closely rusty-tomentose. *Leaves* 6 by 2½ in. (generally much smaller), very shortly obtusely acuminate or subobtuse, much less cuneate at the base than in the 3 foregoing species, primary nerves 9–10 on each side, secondary not prominent; petiole ¼–¾ in. *Calyx-lobes* ⅛ in., ovate, minutely closely tomentose. *Corolla* ⅕–¼ in.; lobes elliptic, acute, nearly glabrous without. *Berry* ½ in. diam., globose, 1-seeded. *Seed* exalbuminous.—Kurz says his *Payena Griffithii* was *Hexameria*, Griff., a name unpublished either as a genus or section by Griffith. Kurz's diagnosis is so short that placing his plant here is a mere guess.

14. **D. rubens,** *Clarke*; leaves obovate-oblong obtuse glabrous, pedicels ¼ in. axillary minutely tomentose, filaments and corolla-tube within glabrous.

MALACCA; *Maingay* (n. 995).

Shoots minutely closely rusty-tomentose. *Leaves* 4 by 1½ in., base cuneate, drying red, primary nerves not prominent; petiole ⅓ in. *Calyx-lobes* ⅛ in., ovate, subacute, minutely closely tomentose. *Corolla* ¼ in. or more, lobes 6, oblong, obtuse. *Stamens* 12; filaments all short, subequal; anthers oblong, acute, mucronate. *Berry* not ripe, promises to be ½ in. diam.—Not very closely allied to any of the preceding species.

15. **D. Gutta,** *Benth. in Gen. Pl.* ii. 658; leaves obovate-oblong very shortly obtusely acuminate coriaceous, pedicels ⅙ in. in axillary clusters, filaments glabrous longer than the anthers. Isonandra Gutta, *Hook. Lond. Journ. Bot.* vi. 464, t. 16; *Miq. Fl. Ind. Bat.* ii. 1038, t. 36; *Bentl. & Trim. Med. Pl.* t. 167.

MALACCA and SINGAPORE; *Lobb*, *Maingay*.—DISTRIB. Sumatra.

A tree, 40 ft.; shoots minutely rusty-tomentose. *Leaves* 4½ by 2 in. (sometimes much longer), base cuneate, densely closely rusty-tomentose beneath, ultimately glabrescent, primary nerves 24–30 on each side, not prominent; petiole 1¼ in. *Calyx-lobes* ⅕ in., ovate, obtuse, rusty-tomentose. *Corolla* ⅓ in.; lobes 6, elliptic obtuse. *Stamens* 12. *Ovary* 6-celled. *Berry* ⅘ in., ovoid, 2–1-seeded.—Easily distinguished from all the preceding species by the numerous primary nerves of the leaf.—Gutta-percha.

6. **BASSIA,** *Linn.*

Trees. *Leaves* petioled, coriaceous, silky or tomentose beneath when young; stipules caducous. *Pedicels* axillary, fascicled, among the subterminal tufts of leaves, or in the axils of fallen leaves. *Calyx-segments* 4, 2-seriate, 2 outer valvate enclosing the inner (except in *B. butyracea*). *Corolla-tube* campanulate; lobes 6–12 (usually 8–10), contorted in bud. *Stamens* at least twice as many as the corolla-lobes, 12–40 (usually 16–20); anthers lanceolate, acute, connective often mucronate or excurrent. *Ovary* villous, 4–12-

(usually 6–8-) celled; style linear. *Berry* globose or oblong-ellipsoid, 1–3- (rarely 4–5-) seeded. *Seeds* ellipsoid, hilum long, sometimes large; albumen 0; radicle very small; cotyledons hemi-ellipsoid, fleshy.—DISTRIB. Species 30; in India, Malaya and Polynesia.

* Calyx-lobes 4, the 2 outer subvalvate including the others.

† *Species of the Deccan Peninsula and Ceylon* (*B. latifolia*, extending northwards to Kumaon).

1. **B. latifolia,** *Roxb. Cor. Pl.* 20, t. 19, and *Fl. Ind.* ii. 526; leaves elliptic or oblong-elliptic shortly acuminate, calyx rusty-tomentose, anthers 20–30 3-seriate subsessile. *Wall. Cat.* 4163; *A. DC. Prodr.* viii. 198; *Dalz. & Gibs. Bomb. Fl.* 139; *Bedd. Fl. Sylv.* t. 41; *Brand For. Fl.* 289. B. villosa, *Wall. Cat.* 4165.—Mahwah *or* Madhuca, *C. Hamilton in As. Research.* i. 300–308, *with fig.*

Throughout CENTRAL INDIA; alt. 1–4000 ft., abundant; from West Bengal to the Western Ghauts; also wild in the KUMAON Terai.—DISTRIB. Ava.

A tree, 50 ft., with a large head, the leaves clustered at the ends of the branches; all the young parts densely rusty-woolly. *Leaves* 5 by 3 in., varying in size, and from round-obovate to broad-lanceolate, acute, base cuneate, densely woolly beneath when young, in age glabrescent, primary nerves 12 on each side, subparallel, $\frac{1}{4}$–$\frac{1}{3}$ in. apart, secondary very prominent, glabrous or obscurely pubescent; petiole 1–1$\frac{1}{2}$ in.; stipules linear, caducous. *Pedicels* 1–1$\frac{1}{2}$ in., woolly, in dense clusters near the ends of the branches. *Calyx-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in., ovate, subacute, densely rusty-tomentose; nearly always 4, rarely 5; the two outer segments always subvalvate and enclosing the others. *Corolla* $\frac{2}{3}$ in., yellowish white, tube fleshy; lobes 7–14 (usually 8–9), short, erect. *Stamens* usually 24–26; anthers hairy, acuminate. *Berry* 1–2 in., ovoid, 1–4-seeded.—The corollas, collected and dried, form an important article of food both for men and animals in Central India, and yield by distillation a coarse spirit. The seeds yield an inferior oil, largely eaten by the tribes. Moa-tree, of the English denizens.

2. **B. longifolia,** *Linn. Mant.* 563: leaves lanceolate narrowed at both ends glabrous distinctly nerved, anthers 16 2-seriate subsessile tips 3-toothed, young fruit globose densely hirsute. *Gaertn. Fruct.* t. 104; *Lamk. Ill.* t. 398; *Wall. Cat.* 4162; *Roxb. Fl. Ind.* ii. 523; *A. DC. Prodr.* viii. 197; *Wight Ill.* t. 147; *Dalz. & Gibs. Bomb. Fl.* 139; *Thwaites Enum.* 175; *Bedd. Fl. Sylv.* t. 42.

MALABAR; from Canara southwards, and CEYLON; common.

A tree, 50 ft.; leaves clustered towards the ends of the branches; all the young parts rusty-tomentose. *Leaves* 4–5 by 1$\frac{1}{2}$ in., mature glabrescent, primary nerves 12 on each side, distinct, secondary distinct; petiole 1–1$\frac{1}{2}$ in.; stipules linear. *Pedicels* 1–2 in., tomentose, in dense clusters near the ends of the branches. *Calyx-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in., ovate, subacute. *Corolla* $\frac{2}{3}$ in.; lobes usually 6, scarcely one-third the length of the tube. *Filaments* hairy; anthers 3-toothed at the apex (A. DC.), the short mucronation of the connective between the tips of the two cells giving this appearance more strongly than is indicated in any of the figures. *Berry* 1–1$\frac{1}{2}$ in. diam., globose, ultimately nearly glabrous, 1–2-seeded or (*fide* Roxburgh) sometimes 3–4-seeded.—The figure of Gaertner shows the fruit 5-seeded, which may be an error; A. DC. doubts this figure, while he expresses no doubt about Lamarck's (Ill. t. 398) which is copied from it. This species has been much confounded with the next, but the young fruit is widely different.

3. **B. malabarica,** *Bedd. For. Man.* 140; branchlets glabrous, leaves lanceolate or oblong obtuse or scarcely acute glabrescent distinctly nerved, stamens 16 in 2 series subsessile connective excurrent lanceolate-linear, young fruit oblong-lanceolate glabrous.

SOUTH CANARA, MALABAR, and the ANAMALLAYS; up to 4000 ft., abundant, *Beddome.*

A middle-sized tree. *Leaves* scattered, 10 by 2½ in., tapering at both ends, or 3 by 1½ in., subobtuse at both ends, primary nerves 15–25 on each side, secondary distinct; petiole ¼–¾ in. *Flowers* in axillary clusters near to or distant from the ends of the branches, closely resembling those of *B. longifolia*. *Filaments* short, hairy; connective much produced. *Berry* 1 by ⅓ in., often oblique, scarcely obtuse when ripe; 1-seeded in all the examples.—The leaves vary greatly in size and shape if there be not two species here included; perhaps it should be united with *B. neriifolia* and *Moonii*.

4. **B. Moonii,** *Bedd. For. Man.* 140; branchlets rusty-villous, leaves oblong-lanceolate obtusely acuminate glabrescent distinctly nerved. Dasyaulus Moonii, *Thwaites Enum.* 176.

CEYLON; Caltura, *Moon*; Ratnapoora, *Thwaites*.

Does not appear to differ from *B. malabarica*, except by rusty villous shoots.—*Seeds* sparingly albuminous (Thwaites).

5. **B. neriifolia,** *Moon. Cat. Pl. Ceyl.* 36; branchlets glabrous, leaves very narrowly oblong coriaceous nerves obscure, anthers 16 2-seriate subsessile connective excurrent lanceolate-linear, young fruit oblong-lanceolate glabrous. *Bedd. For. Man.* 140, and *Fl. Sylv.* t. 254. Dasyaulus neriifolius, *Thwaites Enum.* 175.

CEYLON; common, *Thwaites*.

Leaves 4½ by ¾ in. in Thwaites' typical example, broader and obtuser in others. Except by the texture of the leaves this seems undistinguishable from *B. malabarica*. Beddome's analysis does not show the anthers acute enough.

6. **B. fulva,** *Bedd. For. Man.* 140; leaves elliptic or obovate subobtuse at both ends densely rusty-woolly on the nerves beneath when mature, inflorescence and calyx of *B. malabarica*. Dasyaulus fulvus, *Thwaites Enum.* 176.

CEYLON; Pasdoon Corle, *Thwaites*.

A medium-sized tree. *Leaves* 6 by 3¾ in., coriaceous, somewhat rugose, primary nerves 10–12 on each side, strongly elevated; petiole ½ in., densely rusty-woolly. Inner 2 *calyx-segments* densely rusty-woolly. *Corolla* not seen. *Ovary* 6-celled (Thwaites). *Fruit* not seen.

7. **B. microphylla,** *Hook. Ic. Pl.* t. 74; leaves small obovate or oblong obtuse glabrous, fascicles axillary few-fld., anthers 12 2-seriate subsessile acuminate. *Bedd. For. Man.* 140. B. parvifolia, *A. DC. Prodr.* viii. 198. Dasyaulus microphyllus, *Thwaites Enum.* 175.

CEYLON; *Gen. Walker*; near Galle, *Gardner*.

Branchlets glabrous; shoots rusty-villous. *Leaves* 1–1½ by ¾ in., coriaceous, nerves slender; petiole ⅕ in. *Pedicels* ½ in., nearly glabrous, solitary or few together. *Calyx-lobes* ⅕ in., ovate, subobtuse; 2 entirely within, villous. *Corolla* ⅓ in., cleft to the middle; lobes 6 (rarely 5) obtuse. *Filaments* hairy.

†† *Species of the Malay Peninsula and Andamans.*

8. **B. argentea,** *De Vriese Pl. Reinw.* 62; leaves elliptic rhomboid at both ends silky beneath, fascicles axillary many-fld., flowers small. *Miq. Fl. Ind. Bat.* ii. 1041.

MALACCA; *Maingay*.—DISTRIB. Malayan Archipelago?.

A large tree. *Leaves* 7 by 2¾ in., primary nerves 15 on each side, parallel, strongly raised beneath, secondary obscured by close shining silk; petiole ½–¾ in. *Pedicels* as long as the petioles, 4–10 together in the axils of persistent leaves. *Calyx-segments* ⅙ in., ovate, obtuse, closely tomentose. *Anthers* acute, hairy on all sides.—Maingay's specimens named *argentea* are too imperfect for analysis; they agree with De Vriese's

diagnosis. In the absence of fruit it is uncertain whether either may not be a *Payena*.

9. **B. Lobbii,** *Clarke*; leaves elliptic acutely cuneate at both ends glabrous distinctly reticulated, pedicels 1¼ in. with the calyx-lobes closely cinereous-tomentose.

MOULMEIN; banks of the Attran, *Lobb*.

Shoots grey-tomentose. *Leaves* 2½ by 1¼ in., submembranous, primary and secondary nerves distinct; petiole ½ in. *Pedicels* from the terminal tufts of leaves. *Calyx-lobes* ¼ in., elliptic-oblong. *Corolla* 10–12-lobed. *Stamens* about 18; filaments short; anthers lanceolate, mucronate. *Ovary* 8-celled.—Possibly a *Payena*, but the long calyx-lobes and habit suggest *Bassia*.

10. **B. Mottleyana,** *De Vriese in Miq. Journ.* 1861, 257; leaves long-petioled broadly elliptic abruptly shortly acuminate at both ends glabrous, fascicles very numerous axillary dense-fld.

MALACCA; *Griffith* (Kew Distrib. n. 3608).—DISTRIB. Borneo.

Leaves 5 by 2¾ in., coriaceous, primary nerves numerous not prominent nor very oblique; petiole ¾–1½ in. *Pedicels* ½ ¾ in.; fascicles in the axils of persistent leaves and clothing the branches below the leaves. *Calyx*-lobes ⅙–⅕ in., ovate, scarcely acute, sparingly tomentose. *Corolla* 8–10-lobed. *Stamens* 16–18; anthers subsessile, lanceolate, acute. *Ovary* 6–8-celled. *Fruit* not seen.

11. **B. cuneata,** *Blume Bijd.* 675; leaves obovate obtuse or emarginate coriaceous glabrous, seeds exalbuminous. *Miq. Fl. Ind. Bat.* ii. 1041.

MALACCA; *Maingay*.—DISTRIB. Java.

Leaves 4½ by 2¾ in., attenuated at the base, primary nerves slender, not very oblique; petiole ¾ in. *Flowers* not seen. *Berry* ¾-1 in. diam., globose, 1 3-seeded. *Seeds* ½–⅝ in., ovoid, shining-chestnut; hilum elliptic, oblique, covering one-third the surface; radicle exceedingly small, cotytedons hemi-ellipsoidal fleshy.—Maingay's examples (in ripe fruit) are here referred to Blume's *B. cuneata* merely from his short description of that plant in flower. Whether *B. obovata*, Forst., from Tanna, differs is doubtful. Maingay's cuneate-emarginate leaved plant has been supposed to be the fruiting state of *B. Mottleyana*; the two appear closely allied.

12. **B. caloneura,** *Kurz Andaman Rep.* 141; leaves large elliptic-oblong base rounded or obtuse, fruit 1¼ by 1 in. rusty 2-seeded. Isonandra ? caloneura, *Kurz For. Fl.* ii. 119, and *in Journ. As. Soc.* 1877, pt. ii. 229. I. calophylla, *Kurz in Journ. As. Soc.* 1871 pt. 69, and 1873 pt. ii. 88, *not of Teysm. & Binn.* Dichopsis ? caloneura, *Hook. f. in Gen. Pl.* ii. 658.

SOUTH ANDAMAN; frequent, *Kurz*.

A tree, 60 ft.; shoots minutely rusty-silky. *Leaves* 8½ by 2¾ in., acute, mature glabrous; petiole ½ in. A very obscure plant. Kurz describes the calyx (Journ. As. Soc. 1873, and For. Flor.) as 6-lobed, and the seed (Journ. As. Soc. 1877) as exalbuminous; but he never saw the flower. He elsewhere describes the calyx as 4-lobed, and he has finally put the plant into an albuminous genus.—Our specimen has no flower, and the solitary fruit has no calyx and is unfit for analysis: as, however, it altogether resembles that of a *Bassia*, and is quite unlike that of an *Isonandra*, we retain the plant in the former genus.

** Calyx-lobes 5, much imbricated, not or obscurely 2-seriate.

13. **B. butyracea,** *Roxb. in As. Research.* viii. 499-502, *with fig.*, and *Fl. Ind.* ii. 527; leaves obovate or obovate-oblong, stamens 30–40, filaments glabrous as long as the anthers. *Wall. Cat.* 4164; *Don Prodr.* 146; *A. DC. Prodr.* viii. 198?; *Brand. For. Fl.* 290, t. 35.

SUBTROPICAL HIMALAYA; alt. 1–5000 ft.; from Kumaon to Bhotan, frequent.

A tree, attaining 70 ft. *Leaves* 13 by 6 in. (or smaller), crowded near the ends of

the branches, subobtuse, base rhomboid, tomentose when young, mature glabrous or flocculose beneath, primary nerves 16 on each side; petiole $1\frac{1}{4}$ in.; stipules $\frac{1}{5}$ in., ovate-lanceolate, caducous. *Pedicels* 1 in., very many, crowded among the subterminal leaves, tomentose. *Calyx-lobes* $\frac{1}{3}$–$\frac{1}{2}$ in., ovate, subsimilar, rusty-villous. *Corolla* $\frac{3}{4}$ in.; lobes 8–10, spreading. *Anthers* exserted, linear-lanceolate. *Ovary* 7–9-celled. *Berry* 1 by $\frac{2}{3}$ in., 1–3-seeded.—A. DC. says the calyx is 4-lobed, whence it must be very doubtful whether he had the true plant.

7. PAYENA, *A. DC.*

As *Bassia*, but the seeds albuminous. *Corolla* deeply lobed, and flowers in the axils of scattered leaves.—DISTRIB. Species 8–10 ?, in the Malay Peninsula and islands.

As the fruit is only known in the first described species, the four others may prove to be *Bassias*.

1. **P. Maingayi,** *Clarke*; leaves large oblong acuminate, flowers large, filaments and anthers glabrous, connective produced narrow-lanceolate. Ceratophorus sp., *Maingay ms.* Chrysophyllum ? molle, *Wall. Cat.* 4161 ?.

MALACCA; *Maingay.* ? Penang; *Wallich.*

Branchlets rusty-tomentose. *Leaves* 9 by $2\frac{1}{2}$ in., parallel-sided, abruptly acuminate, base cuneate, shining brown-silky beneath, ultimately glabrescent, primary nerves 24 on each side, not prominent nor very oblique; petiole 1 in. *Pedicels* $\frac{2}{3}$ in., 2-6 together, clothing the branches and in the axils of persistent leaves, minutely silky. *Calyx-lobes* $\frac{1}{3}$ in., ovate, subacute, closely silky. *Corolla* $\frac{1}{2}$ in., divided nearly to the base; segments 10, lanceolate, distinctly 2-seriate. *Stamens* 16-20. *Ovary* 6–8-celled. *Berry* $1\frac{1}{2}$ by $\frac{3}{4}$ in., 1-seeded. *Seed* brown, shining, albuminous; hilum very large.—Wallich's *C. molle* consists of a branchlet with leaves only, from Penang.—Abounds in gutta-percha (Maingay).

2. **P. malaccensis,** *Clarke*; leaves large obovate or obovate-oblong conspicuously nerved, filaments and anthers with long fulvous hairs, connective produced linear-cuspidate. Keratophorus Wightii, *Maingay mss., not of Hassk.*

MALACCA; *Griffith* (Kew Distrib. n. 3610), *Maingay.*

Branchlets nearly glabrous. *Leaves* 12 by $6\frac{1}{2}$ in., subobtuse, base cuneate, ultimately glabrous, primary nerves 15–20 on each side, curving upwards; petiole $1\frac{1}{2}$ in. *Pedicels* $\frac{2}{3}$ in., closely silky; in numerous axillary fascicles. *Calyx-lobes* 2 outer $\frac{1}{5}$ in., subquadrate, obscurely silky, much overlapping, 2 inner longer, subacute, densely villous. *Corolla* $\frac{1}{4}$ in., divided nearly to the base; lobes 10, narrow-lanceolate, sub-2-seriate. *Stamens* 16–20; filaments short. *Fruit* not seen.

3. **P. lucida,** *A. DC. Prodr.* viii. 197; leaves elliptic acuminate primary nerves somewhat oblique to the midrib, filaments and anthers glabrous, connective excurrent tip glabrous. *Kurz For. Fl.* ii. 121, and *in Journ. As. Soc.* 1877, pt. ii. 230. Mimusops lucida, *Wall. Cat.* 4147; *G. Don Gen. Syst.* iv. 35 (*wrongly described, not of Poir.*).

PENANG; *Wallich.* SINGAPORE; *Lobb.*

Branchlets and shoots rusty-tomentose. *Leaves* $3\frac{3}{4}$ by $1\frac{1}{4}$ in., tapering at both ends, glabrous and somewhat shiny beneath, nerves not prominent; petiole $\frac{1}{4}$ in. *Pedicels* clustered in the axils of persistent leaves, $\frac{1}{2}$–1 in., slender, minutely silky. *Calyx-lobes* $\frac{1}{5}$ in., obtuse, obscurely silky. *Corolla* $\frac{1}{4}$–$\frac{1}{3}$ in., deeply divided; lobes 8, oblong, obtuse. *Stamens* 16; filaments short. *Ovary* 8-celled.—*Bassia sericea* (Blume Bijd. 674) is perhaps the same species, but has the primary nerves closer, the pedicels rather shorter. Miquel admits *Bassia sericea*, Blume, as a species, and also *Payena* ?

sericea, Miq., which, from the authentic example, is seen to be quite different, though probably a true *Bassia*.

VAR. *Wightii*; leaves larger very coriaceous gradually or abruptly shorter acuminate, pedicels stouter, sepals larger rusty-tomentose. Isonandra polyandra, *Wight Ic.* t. 1589. Keratophorus Wightii, *Hassk. in Retz.* 101.—Malacca; *Griffith* (Kew Distrib. n. 3605), *Maingay.*—This is perhaps specifically distinct from *P. lucida*; and of this there are two forms having the flowers alike but leaves somewhat differing, viz. (1) Wight Ic. t. 1589, leaves 6¼ by 2¾ in. obovate-oblong suddenly shortly acuminate; (2) Griffith n. 3605, leaves 5 by 1¾ in. oblong-lanceolate long-acuminate. Griffith and Maingay have each collected both forms, and have each kept them apart as being distinct species.

4. **P. paralleloneura,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 70, and *For. Fl.* ii. 121; leaves narrowly elliptic-acuminate, primary nerves nearly horizontal, filaments and anthers glabrous, connective excurrent tipped with fulvous hairs.

MERGUI; *Helfer* (Kew Distrib. n. 3611).

Leaves 3½ by 1½ in., base broadly rhomboid, primary nerves very slender; petiole ⅓ in. *Pedicels* ⅓–½ in.—This seems exceedingly near *P. lucida* and *Bassia sericea*, Blume.

8. MIMUSOPS, *Linn.*

Trees. *Leaves* elliptic or obovate, coriaceous; primary nerves numerous, spreading, slender or obscure. *Pedicels* clustered or solitary, axillary. *Calyx-segments* 6–8, 2-seriate, outer series valvate in bud, including the inner imbricated series. *Corolla-tube* short, lobes 18–24, 2–3-seriate. *Stamens* 6–8 (in *M. littoralis* 12–16), inserted near the base of the corolla, opposite its interior series of lobes; filaments short; anthers lanceolate, connective excurrent; staminodes as many as the stamens, entire serrate or lobed. *Ovary* hairy, 6–8-celled. *Fruit* globose, 6–1-seeded; endocarp crustaceous. *Seeds* compressed, ellipsoid; albumen fleshy; cotyledons flat, often nearly as wide as the seed.—DISTRIB. Species 30; in the tropics of both hemispheres.

1. **M. Elengi,** *Linn.*; *Roxb. Cor. Pl.* i. 15, t. 14, and *Fl. Ind.* ii. 236; leaves elliptic shortly acuminate, stamens 8, berry 1-seeded. *Gaertn. Fruct.* i. 198, t. 42; *Lamk. Ill.* t. 300; *Wall. Cat.* 4146; *A. DC. Prodr.* viii. 202; *Grah. Cat. Bomb. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 140; *Wight Ic.* t. 1586; *Bedd. Fl. Sylv.* t. 40; *Kurz in Journ. As. Soc.* 1877, pt. ii. 231, and *For. Fl.* 123.—*Rheede Hort. Mal.* i. t. 20. *Rumph. Herb. Amb.* ii. t. 63.

DECCAN and MALAY PENINSULAS; common. In North India frequently cultivated. DISTRIB. Cultivated in the Tropics.

A tree, 50 ft. *Leaves* 3½ by 1¾ in., base rhomboid, glabrous, nerves slender numerous nearly horizontal; petiole ¾ in. *Pedicels* ½–¾ in., rusty-tomentose. *Calyx-lobes* 8, ⅓ in., elliptic, acute, rusty-tomentose. *Corolla-lobes* 16–20, narrow-lanceolate, white. *Staminodes* 8, pilose, acute, serrate or subentire. *Berry* ¾–1 in., ovoid, 1- (rarely 2-) seeded, yellow.

2. **M. Roxburghiana,** *Wight Ic.* t. 1588; leaves broadly elliptic very obtuse at both ends, stamens 6 (rarely 7), berry 6–3-seeded. *Bedd. For. Man.* 143; *Brand. For. Fl.* 293.

SHEVAGHERRY and AYAMALLAY HILLS; *Wight.*

A large tree. *Leaves* 3 by 1¾ in., coriaceous, glabrous, nerves very slender; petiole ½–¾ in. *Pedicels* 2–4 together, 1 in., nearly glabrous, near the ends of the branches. *Calyx-lobes* 6, ⅓ in., triangular-lanceolate, mealy-tomentose. *Corolla* nearly as of *M. Elengi*, but segments rather fewer. *Staminodes* 6 (rarely 7), lanceolate serrate. *Berry* ½ in. diam., depressed-globose, shining. Flowers as large as, and like those of *M. Elengi*; but the calyx is only 6-lobed. There are no specimens at

Kew except the very complete set collected by Wight; but Col. Beddome says the tree is common in the Nilgherry and Anamallay forests.

3. **M. hexandra,** *Roxb. Cor. Pl.* i. 16, t. 15, and *Fl. Ind.* ii. 238; leaves elliptic-obovate obtuse or emarginate, stamens 6 (occasionally 7–8), berry 1- (sometimes 2-) seeded. *Wall. Cat.* 4148, A, B; *A. DC. Prodr.* viii. 204; *Grah. Cat. Bomb. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 140; *Bedd. For. Man.* 142. M. indica, *A. DC. l. c.* 205; *Wight Ic.* t. 1587; *Brand. For. Fl.* 291. M. Kauki, *Wall. Cat.* 4149, A, C, *not of Linn.*

DECCAN PENINSULA and CEYLON, common; extending north to Gujerat, Banda and the Circars. Cultivated in North-west India.

A large tree. *Leaves* 3-4 by 1½–2 in., base cuneate or rhomboid, coriaceous, nerves obscure; petiole ⅓–½ in. *Pedicels* ¼–⅓ in., 2–5 together, nearly glabrous; clusters subterminal, and along the branches, often dense. *Calyx-lobes* 6, ⅙–⅕ in., elliptic, subacute, obscurely tomentose or nearly glabrous. *Corolla* ¼ in. long, white. *Staminodes* 6–8, serrate or lobed. *Berry* ½ by ¼ in., wider when 2-seeded. - The staminodes are rather more lobed in the well-developed examples.

4. **M. Kauki,** *Linn. Sp. Pl.* 497; leaves long-petioled obovate-elliptic silky-white beneath, stamens 6–8, berry usually 4–3-seeded. *Wall. Cat.* 4149, E, upper half; *A. DC. Prodr.* viii. 203; *Miq. Fl. Ind. Bat.* ii. 1042; *Grah. Cat. Bomb. Pl.* 106. M. balota, *Blume Bijd.* 673. M. dissecta, *Br. Prodr.* 531, *in obs.*; *Hook. Bot. Mag.* t. 3157; *A. DC. l. c.* 204. M. Hookeri, *A. DC. l. c.* M. Browniana, *Benth. Fl. Austral.* iv. 285.—*Rumph. Herb. Amb.* iii. t. 8.

BIRMA, at Amherst; *Wallich.* MALACCA; *Griffith.*—DISTRIB. Malaya, Tropical Australia.

A large tree. *Leaves* 4 by 2 in., obtuse or scarcely acute, base cuneate, nerves obscure; petiole 1–1½ in. *Pedicels* 1 in., densely clustered near the ends of the branches, cinnamoneous-tomentose. *Calyx-lobes* 6, ¼ in., ovate, subacute, brown-tomentose. *Corolla* ⅓ in. long, lobes narrow, acute. *Staminodes* 6–8, serrate or lobed. *Berry* ¾–1 in. diam., globose, smooth.—Among the secondary sheets of *Wall. Cat.* 4148 are *Achras Sapota* and *Sideroxylon ferrugineum.* The great difficulty that has been raised over *M. Kauki*, Linn., has been due to two causes: (1) Wallich identified his Amherst plant, the true *M. Kauki*, with Roxburgh's Deccan *M. hexandra*; (2) botanists, not looking to the fruit, and perhaps not having it always to look at, have betaken themselves to the degree of notching of the staminodes for diagnostic characters.

ANOMALOUS SPECIES.

5. M. LITTORALIS, *Kurz For. Fl.* ii. 123, and *in Journ. As. Soc.* 1876, pt. ii. 138; leaves large elliptic or obovate glabrous beneath, fruit 1–1½ in. diam. 6–5-seeded. M. indica, *Kurz Andaman Rep.* 42, and *in Journ. As. Soc.* 1871, pt. ii. 70, *not of A. DC.*

ANDAMAN ISLDS.; *Kurz*, *Helfer* (Kew Distrib. n. 3613). NICOBARS; *Kurz.*

A tree, 50–80 ft.; all parts quite glabrous. *Leaves* 7½ by 3¾ in., not acute, base cuneate, coriaceous; petiole ¾ in. *Pedicels* 1 in., clustered towards the ends of the branches, 1 in each axil.—The Kew specimens have no flowers, but represent a large species allied to *M. Kauki.* Kurz describes the calyx as 6–8-lobed, and the fertile stamens as 12–16, with as many staminodes; indicative perhaps of a new genus.—Andaman Bullet-wood.

ORDER XC. EBENACEÆ. (By C. B. Clarke.)

Trees or shrubs. *Leaves* alternate, rarely subopposite, exstipulate, entire, usually coriaceous. *Flowers* usually diœcious, regular, axillary, subsessile or in short cymes, usually bracteate; pedicels articulated under the flower. *Calyx*

inferior, gamosepalous, in fruit often accrescent. *Corolla* gamopetalous, often hairy without. *Stamens* as many or 2–3 times as many as the corolla-lobes, hypogynous, free or filaments paired or variously united; anthers narrow, dehiscing longitudinally; staminodes in the female flower resembling stamens or 0. *Ovary* superior, sessile; styles 2–8; cells as many or twice as many as the styles, imperfectly septate; ovules twice as many as the styles, attached to the interior angle of the cells, pendulous, anatropous. *Fruit* coriaceous or fleshy, indehiscent, several- or few-seeded. *Seeds* pendulous, usually oblong, longitudinally 2–3-furrowed, testa thin, albumen copious equable or ruminated; embryo axile, radicle superior.—Species 250, in the tropics of the whole world; a few species in South Africa and North America.

Flowers often 3-merous. Ovary 3- or 6-celled . . . . 1. MABA.
Flowers mostly 4–5-merous. Ovary 4–5- or 8–10-celled . . . . 2. DIOSPYROS.

1. **MABA,** *J. R. & G. Forst.*

Trees or shrubs. *Leaves* alternate, entire. *Flowers* diœcious (monœcious in *M. Maingayi*), axillary, short-pedicelled or in small dense cymes; usually 3-merous, rarely 4-5-merous. *Calyx* 3–5-partite or 3–5-fid, rarely subtruncate, often cupuliform and enlarged in fruit. *Corolla-tube* usually longer than the calyx, lobes 3, twisted to the right-hand. *Male flowers*: stamens 3–22; filaments distinct, paired or otherwise united; anthers oblong; ovary rudimentary. *Female flowers*: staminodes 0–12; ovary 3-celled, or 6-celled, or 3-celled with imperfect dissepiments between the ovules; 6-ovulate. *Fruit* ellipsoid or globose, glabrous or hairy, 1–6-celled, 1–6-seeded. *Albumen* not ruminated (where known) in any of the Indian species except *M. Maingayi*.—DISTRIB. Species 60, in the tropics of both hemispheres and frequent in Australia and Polynesia.

SECT. I. **Ferreola** (Hiern in Trans. Camb. Phil. Soc. xii. 107). *Calyx-lobes* not much imbricated. *Ovary* densely hairy.

* *Fruiting calyx small, 3-partite, patent or reflexed.*

1. **M. acuminata,** *Hiern in Trans. Camb. Phil. Soc.* xii. 112; leaves elliptic much acuminate, stamens 4–5, fruit $\frac{1}{2}$ in. diam. tomentose. Macreightia acuminata, *Thwaites Enum.* 424; *Bedd. For. Man.* 147.

CEYLON; Hinidoon Pattoo, *Thwaites.*

A medium-sized tree; branchlets fulvo-sericeous, soon glabrescent. *Leaves* 3 by 1–1$\frac{1}{4}$ in., thinly coriaceous, soon glabrescent; base rhomboid or almost rounded; petiole $\frac{1}{8}$ in. *Male fl.*: calyx $\frac{1}{8}$ in.; corolla-tube $\frac{1}{4}$ in.; rudiment of ovary oblong, acute, pilose.

2. **M. oblongifolia,** *Hiern in Trans. Camb. Phil. Soc.* xii. 112; leaves oblong or elliptic acuminate, stamens about 12, fruit $\frac{3}{4}$–1 in. diam. brown tomentose almost hirsute. Macreightia oblongifolia, *Thwaites Enum.* 183; *Bedd. Fl. Sylv.* (*Anal. Gen.*) t. 21, fig. 1, and *For. Man.* 147, *not of Kurz.*

CEYLON; Galle and Ratnapoora, *Thwaites.*

A small tree; branchlets patently fulvous-hairy, at length glabrescent. *Leaves* 6 by 2$\frac{1}{2}$ in., base rounded, subcoriaceous, patently fulvous hairy on the nerves beneath, ultimately glabrous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Male fl.* crowded, sessile; calyx $\frac{1}{4}$ in., shortly 3-lobed; corolla-tube $\frac{1}{4}$ in., limb 3-fid; stamens glabrous; rudiment of ovary minute, pilose. *Female fl.* solitary, subsessile; calyx $\frac{1}{6}$ in., divided nearly to the base; corolla-limb 3-fid; stamens 0; ovary 3-celled, style divided into 3 glabrous stigmas. *Fruit* 3–6-seeded. *Seeds* $\frac{1}{2}$ by $\frac{1}{3}$ in., black, albumen equable.

3. **M. ovalifolia,** *Hiern in Trans. Camb. Phil. Soc.* xii. 113; leaves elliptic or subovate narrowed to a scarcely-acute apex, stamens 13–16. Macreightia ovalifolia, *Thwaites Enum.* 424; *Bedd. For. Man.* 147.

CEYLON; Hinidoon Pattoo, *Thwaites.*

A medium-sized tree; branchlets patently fulvous-hairy soon glabrescent. *Leaves* 3 by $1\frac{1}{2}$ in., base rhomboid or nearly rounded, subcoriaceous, fulvous-hairy beneath when young, soon glabrescent; petiole $\frac{1}{8}$–$\frac{1}{5}$ in. *Male fl.* crowded, sessile; calyx $\frac{1}{5}$ in., shortly acutely 3-lobed; corolla-tube $\frac{1}{5}$ in.; limb 4-fid (in one example at least); stamens glabrous; ovary-rudiment minute. *Female* not known.

** *Fruiting calyx cupuliform at the base, often enlarged.*

4. **M. nigrescens,** *Dalz. in Dalz. & Gibs. Bomb. Fl.* 142; branchlets patently fulvous-hairy, leaves lanceolate scarcely acute, male fl. subsessile in short cymes, fruits ellipsoid when young with fulvous hairs upwards. *Hiern in Trans. Camb. Phil. Soc.* xii. 115.

WESTERN GHAUTS, from the Concan to Mysore; *Dalzell, Ritchie,* &c.

A tree, 15 to 35 ft. (Ritchie); young branches almost shaggy. *Leaves* 2 by $\frac{2}{3}$ in., narrowed at both ends, fulvous-hairy on the midrib beneath and margins, soon glabrescent; primary nerves indistinct, secondary prominently finely reticulated; petiole $\frac{1}{8}$ in. *Male fl.* 1–5 together, 3–4-merous; calyx $\frac{1}{5}$ in., lobes short triangular; corolla $\frac{1}{3}$ in., tube campanulate; stamens 9 or (in 4-merous flowers) 6–4, glabrous; rudiment of the ovary hairy. *Female fl.* 1–2 together, 3-merous; stamens 0; ovary 3-celled. *Fruit* $\frac{1}{3}$ by $\frac{1}{4}$ in.; calyx (in fruit) $\frac{1}{3}$ in. diam., shortly cupuliform.

5. **M. buxifolia,** *Pers. Syn.* ii. 606; branchlets soon glabrous, leaves elliptic or obovate obtuse, flowers 1–3 together subsessile in very short cymes, fruits globose or ellipsoid soon glabrous. *Wight Ic.* t. 763; *A. DC. Prodr.* viii. 240; *Thwaites Enum.* 183; *Hiern in Trans. Camb. Phil. Soc.* xii. 116; *Bedd. Fl. Sylv.* (*Anal. Gen.*) t. 19, fig. 4, and *For. Man.* 148, *partly*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 139. M. littorea, *Br. Prodr.* 527. M. Cumingiana, madagascariensis, guineensis *and* Smeathmanni, *A. DC. l. c.* 241. M. neilgherrensis, *Wight Ill.* t. 148, *bis* E. M. Ebenus, *Wight Ic.* tt. 1228–9, *not of Spreng.* Maba?, *Wall. Cat.* 7461. Ferreola buxifolia, *Roxb. Cor. Pl.* i. 35, t. 45, and *Fl. Ind.* iii. 790.

SOUTH DECCAN PENINSULA with CEYLON, common. MALAY PENINSULA; from PEGU to MALACCA, frequent.—DISTRIB. Malay Islds. to N. Australia and the Philippines. Tropical Africa with Madagascar.

A bush, or in the hills a small tree. *Leaves* (very variable) $\frac{1}{4}$–1 in., narrowed at the base, soon glabrescent; primary nerves indistinct, secondary finely reticulated; petiole $\frac{1}{12}$ in. *Flowers* 3-merous; calyx $\frac{1}{10}$ in., campanulate, lobes short triangular; corolla campanulate, lobes oblong. *Male fl.*: stamens 6–12, glabrous; ovary-rudiment hairy. *Female fl*: stamens 0; ovary 3-celled; style 3-lobed at the apex. *Fruit* $\frac{1}{3}$ in., 1-seeded; calyx in fruit cupuliform (often very shortly); albumen equable.

VAR. *Ebenus,* Thwaites l. c.; leaves $2\frac{1}{4}$ by $1\frac{1}{2}$ in. elliptic rounded at both ends.—M. Ebenus, *sp. Wight,* comes about half-way between this and the next var.

Var. *angustifolia,* Thwaites l. c.; leaves 3 by $\frac{2}{3}$ in. narrowly cuneate at both ends.—Except in the glabrate branches this is nearly the same as *M. nigrescens.*

6. **M. andamanica,** *Kurz in Journ. As. Soc.* 1876, pt. ii. 138, and *For. Fl.* ii. 140; leaves large oblong patently hairy on the midrib beneath, female fl. axillary solitary subsessile, berry ellipsoid more than an inch long. Macreightia oblongifolia, *Kurz Andam. Rep.* 11, *not of Thwaites.* M. andamanica, *Kurz Andam. Rep.* ed. ii. 42.—See *Hiern in Trans. Camb. Phil. Soc.* xii. 124.

ANDAMAN ISLDS.; in the upper forests frequent, *Kurz.* NICOBARS; *Kurz.*

A shrub, 3–5 ft.; branchlets hairy. *Leaves* 8 by $2\frac{3}{4}$ in., abruptly subobtusely

acuminate, narrowed towards the subcordate base, soon glabrescent; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Male fl.*: in short-peduncled small cymes; calyx $\frac{1}{8}$ in., lobes 3, acute; corolla fulvous-hairy without; stamens 8, glabrous. *Female fl.* on pedicels $\frac{1}{10}$ in.; bracts minute; calyx $\frac{1}{4}$ in., campanulate, deeply 3-lobed; corolla-tube somewhat widened, constricted under the limb, lobes oblong acute (*Kurz*); ovary 3-celled. *Berries* rather dry, mucronate, smooth, usually 3-seeded. *Seeds* (*Kurz*) $\frac{2}{3}$ by $\frac{1}{4}$ in., albumen equable.

SECT. II. **Holochilus,** gen. Dalz. in Hook. Kew Journ. iv. 290 (character widened to include *Rhipidostigma* (gen.), Hassk. Retz. 103). *Calyx-lobes* not much imbricated. *Ovary* glabrous.

7. **M. micrantha,** *Hiern in Trans. Camb. Phil. Soc.* xii. 133; leaves elliptic-oblong glabrous, female fl. axillary solitary sessile, calyx truncate subentire. Holochilus micranthus, *Dalz. in Hook. Kew Journ.* iv. 291; *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 147.

BOMBAY; Syhadree Hill, *Dalzell.*

A middle-sized tree; branchlets glabrous. *Leaves* 4½ by 1½ in., narrowed at both ends, widest towards the base, coriaceous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., obscurely rusty-puberulous. *Male fl.* unknown. *Female fl.*: calyx $\frac{1}{8}$ in., tubular; corolla $\frac{1}{4}$ in., tubular, 3-lobed nearly half-way down; staminodes 6, distinct; ovary 6-celled; styles 3, erect, rather thick, tip obtuse. *Fruit* 1 by $\frac{1}{3}$ in., 6-celled, 6-seeded; calyx in fruit $\frac{1}{4}$ in. long and as much broad, funnel-shaped.

8. **M. merguensis,** *Hiern in Trans. Camb. Phil. Soc.* xii. 134; leaves ovate or oblong glabrous, female fl. in dense small axillary cymes, calyx lobed half-way down. *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 139.

MERGUI; *Griffith, Helfer.*—DISTRIB. Sumatra, Java, Borneo.

A small tree; nearly glabrous. *Leaves* 6 by 2¾ in., subobtusely acuminate, base obtusely rhomboid or almost rounded; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Male fl.* in compound dense minutely pubescent cymes 1–1½ in. diam.; calyx $\frac{1}{16}$ in., 4- (rarely 3-) merous, lobes triangular or obtuse; corolla $\frac{1}{10}$ in., shortly 4–3-lobed; stamens 14–16, glabrous; ovary rudimentary. *Female fl.*: calyx $\frac{1}{5}$ in., 4- (rarely 3-) merous, lobed half-way down; corolla $\frac{1}{4}$ in., 4–3-merous; staminodes 3 or 6; ovary-cells 6, 1-ovulate; styles 3, distant, glabrous. *Fruit* ½ by $\frac{1}{3}$ in.; calyx in fruit $\frac{2}{3}$ in. diam., lobes ovate spreading. *Albumen* equable.—Kurz l. c. proposes to remove this species to *Diospyros*, to which in its glabrousness, its usually 4-merous flowers, and the large spreading lobes of the calyx in fruit, it shows much affinity.

SECT. III. **Barberia** (Hiern in Trans. Camb. Phil. Soc. xii. 107). *Calyx-lobes* rounded, much imbricated.

9. **M. Maingayi,** *Hiern in Trans. Camb. Phil. Soc.* xii. 138; leaves elliptic or somewhat obovate finally glabrous, fascicles of female fl. 3–5-fld. axillary, flowers 4- (sometimes 5-) merous, flowers and fruits large.

MALACCA; *Maingay.*—DISTRIB. Borneo.

A monœcious tree (*Maingay*); branchlets furfuraceous or subtomentose, soon glabrous. *Leaves* 4 by 2¼ in., obtuse, base cuneate, coriaceous; petiole ½ in. *Male fl.*: calyx 4-partite; corolla-limb 4-partite, stamens 22 (*Maingay*). *Female fl.*: pedicels $\frac{1}{4}$–½ in., densely rusty-woolly; calyx $\frac{1}{4}$ in., wide-campanulate, rusty-woolly, lobes short; corolla tube $\frac{1}{3}$ in., glabrous below suddenly dilated upwards, lobes $\frac{1}{3}$ in., narrow; style short, tip 3-lobed; ovary narrowly-oblong, glabrous, cells 3, 2-ovulate. *Fruits* 1½–2 by 1 in., ellipsoid, 3–1-celled, cells 1–0-seeded; calyx-tube in fruit solid, cylindric, $\frac{1}{5}$ by $\frac{1}{4}$ in.; lobes in fruit horizontal, $\frac{1}{5}$ in. diam., round, imbricate. *Seed* 1 by ½ in., cylindric; albumen strongly ruminated.—The flowers are not in a good state for examination, and the ovaries may perhaps not prove always 3-celled; but Hiern's dissections show conclusively that each cell contains two oblong erect ovules.

2. **DIOSPYROS,** *Linn.*

Trees or (rarely) shrubs. *Leaves* alternate, or (in Sect. *Melonia*) sometimes subopposite, entire. *Flowers* diœcious, very rarely polygamous, axillary and short-pedicelled or in small cymes, sometimes (the females often) solitary; 4–5-merous, very rarely 3-merous. *Calyx* lobed, often deeply (in Sect. *Ebenus* truncate), in the female often larger than in the male, often accrescent and plicate or auriculate in fruit. *Corolla* tubular, salvershaped or campanulate, shortly or deeply lobed, lobes twisted to the right. *Male flowers*: stamens 4–64, often 16; filaments distinct, paired or otherwise united; anthers linear, rarely short; ovary rudimentary. *Female flowers*: staminodes 0–16; ovary 4–5-celled, or 8–10-celled, or 4–5-celled with imperfect dissepiments between the ovules; cells 1- (rarely 2-) ovuled; styles (or stigmas) 1–4. *Fruit* globose, ellipsoid, or ovoid-conic, often supported by the much enlarged, sometimes woody, calyx; flesh often pulpose or viscid. *Seeds* oblong, usually compressed, albumen equable or (in Sect. *Melonia*) ruminated.—Species 153, in the tropics of the whole world; a few in South Africa and North America.

SECT. I. **Gunisanthus** (Genus *A. DC. Prodr.* viii. 219). *Leaves* alternate, (adult) fulvous-pilose at least on the nerves beneath. *Inflorescence* male in loose or short racemose few-flowered cymes, females subsolitary axillary. *Flowers* 4- (rarely 4–5-) merous. *Calyx* divided nearly to the base, nearly similar in the male and female flowers, little accrescent (where known) in fruit. *Corolla* narrowly tubular in the bud, cinereous-pilose or glabrate without when expanded; lobes elliptic. *Stamens* glabrous, 12–16 (or ex Hiern sometimes in *D. apiculata* 6–7 only). *Ovary* (where known) 4-celled; cells 1-ovuled. *Albumen* (only known in *D. apiculata*) equable.

1. **D. pruriens,** *Dalz. in Hook. Kew Journ.* iv. 110; leaves elliptic base obtuse or cordate, male fl. long-pedicelled in small cymes, corolla fulvous-tomentose without. *Dalz. & Gibs. Bomb. Fl.* 141; *Bedd. Ic. Pl. Ind. Or.* t. 129, and *For. Man.* 144; *Hiern in Trans. Camb. Phil. Soc.* xii. 185, *not of Thwaites.*

BOMBAY; *Dalzell, Ritchie.* BABABOODUN HILLS; *Law.*

Shoots fulvous-pilose; branchlets persistently villous. *Leaves* 3 by $1\frac{1}{4}$ in., tip cuneate obtuse, base abruptly narrowed often cordate, fulvous-pilose especially on the nerves beneath, ultimately glabrescent above, chartaceous scarcely coriaceous; primary nerves oblique, secondary not prominent; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Male fl.*: peduncles 0–$\frac{1}{5}$ in., 1–5-flowered; bracts small ovate, glabrous within, caducous; pedicels 0–$\frac{1}{4}$ in.; calyx nearly 4-partite, lobes $\frac{1}{4}$ in., oblong, hairy; corolla $\frac{1}{2}$–$\frac{3}{4}$ in., salvershaped, tube rather longer than the calyx, lobes $\frac{1}{4}$–$\frac{1}{3}$ in. oblong; stamens 13–14, glabrous. *Female fl.* solitary; peduncles $\frac{1}{8}$ in.; calyx and corolla nearly as in the males; ovary 4-celled, 4-ovuled. *Fruit* $\frac{2}{3}$–1 in., ovoid-conical, densely clothed with fulvous stinging hairs; fruiting calyx scarcely enlarged.

2. **D. apiculata,** *Hiern in Trans. Camb. Phil. Soc.* xii. 186; leaves elliptic acuminate base obtuse or cordate, male fl. in short cymes, corolla glabrous without.

PENANG; Government Hill, *Maingay.*

A tree, with slender stem 4 ft. high (*Maingay*); shoots fulvous-hirsute; branchlets persistently villous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{2}$ in., base abruptly narrowed mostly cordate, fulvous-hirsute especially on the nerves beneath, ultimately glabrescent above, chartaceous scarcely coriaceous; primary nerves very oblique, much elevated beneath, secondary not prominent; petiole $\frac{1}{16}$–$\frac{1}{8}$ in. *Male fl.*: peduncles 0–$\frac{1}{8}$ in., 1–4-flowered; bracts small, ovate, glabrous within, caducous; pedicels 0–$\frac{1}{6}$ in.; calyx $\frac{1}{5}$ in., nearly 4-partite, lobes lanceolate glabrous within downwards; corolla $\frac{1}{3}$–$\frac{1}{2}$ in., salvershaped,

tube rather shorter than the calyx, lobes $\frac{1}{5}$ in. elliptic; stamens 12 (sometimes 6–7 *ex Hiern*), glabrous. *Female fl.* 1–3 together, subsessile. *Fruit* 1 by $\frac{1}{2}$ in., ovoid-conic, acute, with scattered fulvous hairs, ultimately nearly glabrous, calyx scarcely accrescent. *Albumen* equable.

3. **D. pilosula,** *Wall. Cat.* 4132; leaves narrowly obovate-lanceolate acuminate cuneate or rhomboid at the base, male flowers long-pedicelled in lax cymes, corolla closely silky without. *Hiern in Trans. Camb. Phil. Soc.* xii. 188. Gunisanthus pilosulus, *A. DC. Prodr.* viii. 220; *Kurz in Journ. As. Soc.* 1877, pt. ii. 232, and *For. Fl.* ii. 125.

KHASIA MTS.; *Wallich.* PEGU; *Brandis.* ANDAMAN ISLDS., *Kurz.*

A small tree, attaining 25 ft. (*Kurz*); branchlets adpressedly fulvous-pilose, at length glabrescent. *Leaves* 4 by $1\frac{1}{3}$ in., base cuneate or scarcely obtuse, hairy principally on the nerves beneath, ultimately nearly glabrous except the midrib beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{5}$ in. *Male fl.* in lax depauperated subracemose cymes, 4-merous; bracts $\frac{1}{5}$ in., ovate, deciduous; pedicels $\frac{1}{3}$ in.; calyx-lobes $\frac{1}{4}$ in., lanceolate; corolla-tube $\frac{1}{4}$–$\frac{1}{3}$ in., slender, pilose without; lobes $\frac{1}{4}$–$\frac{1}{3}$ in.; stamens 12, glabrous. *Female fl.* solitary, calyx and corolla nearly as in the male; ovary 4-celled, cells 1-ovuled; young fruit densely rufous hirsute.

4. **D. martabanica,** *Clarke*; leaves narrowly oblong acuminate obtuse or rounded at the base, male flowers long-pedicelled in lax racemose cymes, corolla fulvous-villous without. Gunisanthus mollis, *Kurz in Journ. As. Soc.* 1873, pt. ii. 88, 1877, pt. ii. 232, and *For. Fl.* ii. 126.

MARTABAN; east of Tounghoo not infrequent, *Kurz.*

A tree, attaining 30 ft.; branchlets hirsute, persistently villous. *Leaves* 6 by $\frac{1}{2}$ in., when young glabrous above, hirsute beneath with fulvous hair $\frac{1}{5}$ in. long, when mature pilose beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{8}$ in. *Male fl.* in lax depauperated subracemose cymes, 4-merous; bracts $\frac{1}{5}$ in., ovate, deciduous; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., calyx-lobes $\frac{1}{6}$ in., narrowly lanceolate; corolla-tube $\frac{1}{3}$ in., slender, lobes $\frac{1}{3}$ in., narrow-oblong; stamens 12–14, glabrous, anthers short-oblong, connective hardly produced. *Female fl.* unknown.—Very nearly allied to *D. pilosula* (Kurz).

VAR. *pellucido-punctata*; leaves 2 in. long. D. vaccinioides, var., *Hiern in Trans. Camb. Phil. Soc.* xii. 231.—Andamans; *Kurz.*—The example exhibits no flowers, one detached imperfect fruit.

5. **D. dasyphylla,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 71; leaves cordate-oblong acute, male flowers in short ferruginous-villous cymes, corolla-tube densely villous without, stamens about 16. *Hiern in Trans. Camb. Phil. Soc.* xii. 203; *Kurz in Journ. As. Soc.* 1877, pt. ii. 237, and *For. Fl.* ii. 138.

MARTABAN HILLS, alt. 4000 ft., *Brandis.*

Branchlets persistently fulvous-villous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{4}$ in., fulvous-pilose on the nerves beneath, chartaceous somewhat coriaceous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{5}$ in. *Male fl.*: cymes $\frac{1}{3}$ in., 2–4-flowered; bracts $\frac{1}{8}$ in., orbicular; calyx $\frac{1}{8}$–$\frac{1}{6}$ in., deeply 4-lobed, lobes round-elliptic, ciliate-pilose; corolla-tube $\frac{1}{5}$ in., lobes $\frac{1}{5}$ in., elliptic; stamens glabrous; anther-cells narrowly oblong, connective shortly produced above them. *Female fl.* unknown.

SECT. II. **Embryopteris.** *Leaves* alternate, adult glabrous or (in *D. Kaki* and *D. montana*, var.) pubescent. *Flowers* 4- (rarely 4–5-) merous; males in small cymes or clustered subsessile (in *D. foliolosa* in rather larger more numerously-flowered cymes); females subsolitary. *Calyx* cleft to the base or half-way down (in *D. Embryopteris* and *D. Toposia* irregularly, less deeply). *Corolla* narrowly tubular in bud; glabrate or nearly so without when expanded (except in *D. Kaki*), urceolate or salvershaped. *Stamens* about 16 (in *D. Embryopteris, D. Kaki* and *D. assimilis* numerous), glabrous or in a

few species somewhat hairy. *Fruit* ellipsoid or subglobose. *Seeds* (where known) with equable albumen.

6. **D. montana,** *Roxb. Cor. Pl.* i. 37, t. 48, and *Fl. Ind.* ii. 538; leaves ovate or oblong pubescent or glabrous base cuneate or obtuse, male fl. in small cymes, calyx small deeply lobed, corolla urceolate glabrous without, stamens 16 glabrous. *Wall. Cat.* 4115, *upper part of type sheet*; *Wight Ic.* t. 1225; *A. DC. Prodr.* viii. 230; *Grah. Cat. Bomb. Pl.* 107; *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 143; *Hiern in Trans. Camb. Phil. Soc.* xii. 220; *Kurz in Journ. As. Soc.* 1877, pt. ii. 235; *Brand. For. Fl* 296. D. cordifolia, *Roxb. Cor. Pl.* i. 38, t. 50, and *Fl. Ind.* ii. 538; *Wall. Cat.* 4116; *A. DC. Prodr.* viii. 230; *Wight Ill.* t. 148; *Thwaites Enum.* 178; *Kurz For. Fl.* ii. 130; *Bedd. For. Man.* 143. D. rugosula, *Br. Prodr.* 526; *A. DC. Prodr.* viii. 229. D. bracteata, *Roxb. Fl. Ind.* ii. 539; *A. DC. l. c.* 239. D. heterophylla, *Wall. Cat.* 4138; *A. DC. l. c.* viii. 230. D. sylvatica, *Wall. Cat.* 4117, *not of Roxb.*; *of A. DC. Prodr.* viii. 231, *as to var. β only*. D. punctata, *Dcne in Nouv. Ann. Mus. d'Hist. Nat.* iii. 467; *A. DC. l. c.* 230. D. Goindu, *Dalz. in Hook. Kew Journ.* iv. 111; *Dalz. & Gibs. Bomb. Fl.* 141. D. Waldemarii, *Klotzsch in Reis. Pr. Waldem.* 101, t. 55.

From the HIMALAYA (from the Ravi eastward, *Brandis*) to CEYLON and TENASSERIM; common.—DISTRIB. Birma, Malay Archipelago, Trop. Australia.

A tree, often spinous; branchlets soon glabrous. *Leaves* $2\frac{1}{2}$ by 1 in., base cuneate or cordate on the same branch, thin, nerves not elevated, though both primary and reticulating nerves often distinct; petiole $\frac{1}{5}$ in. *Male fl.*: cymes $\frac{1}{4}$–$\frac{3}{4}$ in., pubescent or glabrescent; peduncles 0–$\frac{1}{3}$ in.; bracts $\frac{1}{20}$ in.; calyx $\frac{1}{6}$–$\frac{1}{10}$ in., lobes ovate; corolla $\frac{1}{4}$ in., shortly lobed. *Female flowers* solitary; peduncles $\frac{1}{8}$–$\frac{1}{4}$ in.; calyx $\frac{1}{6}$–$\frac{1}{3}$ in., deeply 4-fid; corolla nearly as of the male; staminodes 4–12; ovary 8-celled, cells 1-ovuled. *Fruit* $\frac{1}{2}$–$1\frac{1}{2}$ in. diam., globose, glabrous; lobes of fruiting calyx $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, obtuse, foliaceous. *Seeds* 2–8; albumen not ruminated (Kurz says ruminated in the Pegu tree).—*D. cordifolia* has the female peduncles $\frac{1}{4}$–$\frac{3}{4}$ in., the leaves and calyx subpersistently pubescent; *D. montana* has them glabrescent; Beddome maintains the two to be distinct species.

7. **D. Lotus,** *Linn*; *A. DC. Prodr.* viii. 228; leaves elliptic narrowed upwards membranous at first pubescent beneath, male fl. 2–3 together subsessile, calyx small lobed half-way down, corolla urceolate glabrous without, stamens 16 connective pilose. *Lamk. Ill.* t. 858; *Reich. Ic. Fl. Germ.* t. 1079; *Hiern in Trans. Camb. Phil. Soc.* xii. 223; *Brand. For. Fl.* 297, t. 36; *Boiss. Fl. Orient.* iv. 33.

WEST PUNJAB; Hazara, alt. 3–6000 ft., *Stewart*. WEST KASHMIR and North of PESHAWUR; not uncommon, *Brandis*.—DISTRIB. West Asia. Cultivated in the Mediterranean Region, also (?) in Japan and China.

Resembling *D. montana*; the leaves are larger ($6\frac{1}{4}$ by 2 in. in Stewart's example). —"Fruit much prized by the Affghan tribes" (*Brandis*); hence it may be questioned how far the tree is indigenous in India.

8. **D. Kaki,** *Linn. f. Suppl.* 439; leaves ovate obtuse or narrowed at both ends pubescent reticulated beneath, male flowers in small cymes, calyx lobed deeply, corolla urceolate tube short glabrate lobes tomentose without, stamens 16 pilose. *Roxb. Fl. Ind.* ii. 527; *Grah. Cat. Bomb. Pl.* 107; *Wight Ic.* t. 415; *A. DC. Prodr.* viii. 229, *excl. var. γ*, glabra; *Hiern in Trans. Camb. Phil. Soc.* xii. 227–230, *with fig.*; *Ill. Hortic.* 1871, 176, t. 78; *Kurz in Journ. As. Soc.* 1877, pt. ii. 233. D. chinensis, *Blume Bijd.* 670. D. Schi-Tse, *Bunge Enum. Pl. Chin. Bor.* 42. D. costata, *Rev. Hortic.* 1870, *fig. at p.* 133. D. Roxburghii, *Rev. Hortic.* 1872, tt. 28–29. Embryopteris Kaki, *G. Don. Gen. Syst.* iv. 41.

KHASIA MTS.; Moosmai, Bor Pani, Nunklao, Nurtiung, *H. f. & T.*—DISTRIB. Eastern India, China and Japan, cultivated.

A small tree; branchlets subpersistently villous. *Leaves* 4½ by 2 in., chartaceous scarcely coriaceous; primary nerves oblique, conspicuous beneath; petiole ⅓ in. *Male fl.*: cymes ¼ in., about 3-flowered, pubescent; peduncles 0–⅕ in.; bracts 0–⅕ in., lanceolate-linear; pedicels hardly any; calyx ¼ in., deeply 4-lobed; corolla ⅓ in. *Female fl.* solitary; peduncles ½ in.; calyx-lobes ⅓ in., ovate; corolla ⅓–½ by ¼ in.; staminodes 8; ovary usually 8-celled; style hairy, 4-fid. *Fruit* 1–3 in. diam., globose, edible, very variable in the cultivated plant.

9. **D. Embryopteris,** *Pers. Syn.* ii. 624; leaves oblong obtuse at the base glabrous, male flowers in short cymes, corolla urceolate nearly glabrous without, stamens 24–64 pilose. *Wall. Cat.* 4123; *Bot. Reg.* t. 499; *A. DC. Prodr.* viii. 235; *Griff. Notul.* iv. 289; *Thwaites Enum.* 178; *Bedd. Fl. Sylv.* t. 69; *Hiern in Trans. Camb. Phil. Soc.* xii. 258; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 128; *Brand. For. Fl.* 298. D. glutinosa, *Koen.*; *Roxb. Fl. Ind.* ii. 533; *Grah. Cat. Bomb. Pl.* 107. Embryopteris peregrina, *Gaertn. Fruct.* i. 145, t. 29, fig. 2. E. glutenifera, *Roxb. Cor. Pl.* i. 49, t. 70; *Wight Ic.* tt. 843, 844. E. gelatinifera, *G. Don Gen. Syst.* iv. 41. Garcinia malabarica, *Desrouss.*; *Lamk. Dict.* iii. 701.—*Rheede Hort. Mal.* iii. t. 41.

INDIA from the HIMALAYA (from the Jumna eastward, *Brandis*) to CEYLON and TENASSERIM, very common; abundant in Bengal.—DISTRIB. Siam, Malayan Archipelago.

A dense tree; branchlets glabrous. *Leaves* 5½ by 2 in., obtuse or subacuminate, coriaceous; primary nerves oblique, reticulating nerves distinct, slightly elevated above; petiole ¼–⅓ in. *Male fl.*: cymes ¼–¾ in., few- or many-flowered, puberulous or subtomentose; calyx ¼ in. long and broad, adpressedly cinereous silky, or in the more southern examples black silky or almost hirsute, lobes ⅛–⅙ in., triangular; corolla ⅓ by ⅕ in., tubular-campanulate, lobes $\frac{1}{10}$ in.; filaments short hairy, anthers linear more or less hairy. *Female fl.* 1–5 together, subsessile or cymose; resembling the male, but larger, calyx-lobes wider, subauriculate at the base; staminodes 1–12; ovary 8-celled, glabrous; styles 4, lobed at the tips. *Fruit* usually solitary, 1–2 in. diam., subglobose; glandular or rusty, usually 4–8-seeded; fruiting-calyx much accrescent, lobes ¾ in., ovate, auriculate, base cordate, nearly glabrous.

10. **D. Toposia,** *Ham. in Trans. Linn. Soc.* xv. 115; leaves oblong acuminate coriaceous glabrous, male flowers in small cymes, calyx spathaceo-valvate irregularly lobed, corolla urceolate nearly glabrous without, stamens about 32 glabrous. *A. DC. Prodr.* viii. 237; *Bedd. Ic. Pl. Ind. Or.* t. 122; *Hiern in Trans. Camb. Phil. Soc.* xii. 263; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 128; *Bedd. For. Man.* 144. D. racemosa, *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 536; *Wight Ic.* t. 416. D. lanceolata, *Wall. Cat.* 4122. Embryopteris lanceolata, *G. Don Gen. Syst.* iv. 41.

SILHET; *Roxburgh.* CACHAR; *Keenan.* CHITTAGONG; *Kurz.* CEYLON; *Gardner, Thwaites.*

A large or middle-sized tree; branchlets glabrous. *Leaves* 6½ by 2¼ in., base obtuse or almost rounded, primary nerves not so oblique as in *D. Embryopteris,* reticulated nerves very close distinct; petiole ¼ in. *Male fl.*: peduncles ⅛–⅔ in., nearly glabrous; cymes ¼–1 in., often 3-flowered; calyx ⅕ in., lobes irregular, ovate, acute; corolla ¼ in., tubular-campanulate, shortly 4-lobed. *Female fl.* short-peduncled; calyx and corolla as in the male; staminodes 12–16; ovary 4- (rarely 6-) celled; style 0, stigmas 4. *Fruit* ⅔–1 in., ellipsoid or subglobose, villous finally glabrate, 1–4-seeded; fruiting calyx ⅔ in. across; lobes patent, villous within. *Albumen* equable.

11. **D. foliolosa,** *Wall. Cat.* 4143; leaves oblong acuminate glabrous, male cymes lax, corolla urceolate glabrous without, calyx-lobes of the female

cordate ovate accrescent soon glabrous. *A. DC. Prodr.* viii. 234; *Hiern in Trans. Camb. Phil. Soc.* xii. 188. D. calycina, *Bedd. Fl. Sylv.* t. 68, and *Ic. Pl. Ind. Or.* t. 123.

SHEVAGHERRY HILLS and COURTALLUM; *Wight.* TINNEVELLY HILLS; *Beddome.*

A middle-sized tree; branchlets soon glabrous. *Leaves* 4 by $\frac{3}{4}$–$1\frac{1}{4}$ in., base cuneate or obtusely rhomboid, shining, coriaceous; primary nerves oblique, indistinct, reticulating nerves prominent on both surfaces; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Male fl.*: cymes 2 in., lax, soon glabrescent, pedicels $\frac{1}{8}$–$\frac{1}{3}$ in.; calyx $\frac{1}{10}$ in., lobed half-way down; corolla $\frac{1}{4}$ in., shortly 4-lobed; stamens 12–16, somewhat hairy. *Female fl.* solitary, peduncles $\frac{2}{3}$–1 in.; corolla nearly as in the male; ovary 4-celled, cells 1-ovuled. *Fruit* $\frac{2}{3}$ in. diam., globose, squamose, glabrescent; fruiting calyx foliaceous, lobes $\frac{3}{4}$ in. long and broad, cordate-ovate acute.

12. **D. ovalifolia,** *Wight Ic.* t. 1227; leaves elliptic or oblong cuneate or subobtuse at both ends glabrous, flowers sessile clustered, corolla urceolate glabrous without. *Thwaites Enum.* 181; *Hiern in Trans. Camb. Phil. Soc.* xii. 237; *Bedd. For. Man.* 143.

SOUTH DECCAN PENINSULA; Coimbatore and Nilgherries, *Wight*; Anamallays and Tinnevelly Hills, *Beddome.* CEYLON, alt. 2–4000 ft., *Moon, Thwaites.*

A middle-sized tree; branchlets glabrous. *Leaves* 5 by $2\frac{1}{4}$ in., coriaceous, nerves ultimately distinct; petiole $\frac{1}{4}$ in. *Male fl.* 3–6 together, clusters minutely pilose; calyx $\frac{1}{10}$ in., wide-campanulate, lobes $\frac{1}{16}$ in., deltoid, hairy on both sides; corolla $\frac{1}{5}$–$\frac{1}{4}$ in., tubular-campanulate, lobes 4–5 less than half the length of the corolla, ovate; stamens 13–20, glabrous. *Female fl.* 2–6 together, resembling the males but rather broader; staminodes 0–7; ovary hairy 4–6 celled (2-celled, fide *Wight*); style 2–3-lobed. *Fruits* 1–3 together, $\frac{2}{3}$ in. diam., subsessile, globose, glabrate, usually 1-seeded; lobes of the fruiting calyx $\frac{1}{5}$ by $\frac{1}{5}$ in., reflexed, thick, ferruginous-tomentose on both sides. *Albumen* equable.

13. **D. nigricans,** *Wall. Cat.* 6351; leaves elliptic-lanceolate acuminate glabrous, male flowers subsessile, calyx-lobes small ovate, corolla tubular nearly glabrous without. *A. DC. Prodr.* viii. 239; *Hiern in Trans. Camb. Phil. Soc.* xii. 207; *Bedd. For. Man.* 144.

KHASIA MTS.; *H. f. & T.* SILHET; *Wallich.*

A tree, attaining 50 ft.; branchlets subpersistently grey-pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., base broad-cuneate, often turning black in drying, chartaceous hardly coriaceous; primary nerves slender, indistinct, oblique, reticulating nerves distinct; petiole $\frac{1}{6}$ in. *Male fl.* 3–6 together; calyx-tube very short, lobes 4, $\frac{1}{8}$ in., sparsely pilose; corolla $\frac{1}{3}$ in., deeply lobed. *Female fl.* unknown. *Fruit* solitary, subsessile $\frac{2}{3}$ by $\frac{1}{2}$ in., ellipsoid, glabrous, 4-celled; fruiting calyx divided nearly to the base, blackish; lobes $\frac{1}{3}$ by $\frac{1}{4}$ in., ovate or elliptic, foliaceous, nearly flat and glabrous.

14. **D. variegata,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 73; leaves large broadly oblong acute glabrous, male flowers in very short sparingly pubescent cymes, corolla salver-shaped nearly glabrous without. *Hiern in Trans. Camb. Phil Soc.* xii. 203; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 137.

ASSAM; *Jenkins.* PEGU and MARTABAN; alt. 0–1000 ft., not infrequent, *Kurz.*

A tree, attaining 70 ft. (*Kurz*); glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{1}{2}$–$3\frac{1}{2}$ in., base cuneate or subobtuse, coriaceous; primary nerves oblique strong, reticulating nerves distinct; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Male fl.*: cymes 3–8-flowered, crowded; calyx $\frac{1}{5}$ in., 4-lobed more than half way down, lobes elliptic minutely pubescent; corolla-tube $\frac{1}{4}$ in., narrowed upwards, lobes $4\frac{1}{4}$ in., ovate, subacute, patent; stamens about 16, anthers glabrous.—In an Assam fruiting example (n. 275 *Herb. Kew*); peduncle $\frac{1}{5}$ in.; fruit solitary $\frac{3}{4}$ in. diam., globose, ferruginous-villous; calyx-lobes 4, $\frac{3}{4}$ by $\frac{1}{2}$ in., auriculate, ferruginous-pubescent within. This was matched with Kurz's male examples of *D. variegata* by the leaves, apparently correctly by Hiern, who nevertheless hesitated to

describe the fruit of *D. variegata* from it.—Griffith's Assam examples, referred to by *Hiern l.c.* 223, were finally referred to *D. variegata*, with which the leaves exactly agree: the examples exhibit only leaves and dense panicles 4–6 in. diam. of abortive buds: these are doubtful.

15. **D. Ebenum,** *Koenig*; *A. DC. Prodr.* viii. 234; leaves elliptic obtuse or obtusely cuneate at both ends coriaceous reticulating nervation hexagonal prominent, male fl. in short-peduncled cymes, corolla tubular glabrous without not clavate in the bud, stamens about 16. *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 529; *Wall. Cat.* 4120; *Wight Ic.* t. 188; *Grah. Cat. Bomb. Pl.* 108; *Bedd. Fl. Sylv.* t. 65; *Hiern in Trans. Camb. Phil. Soc.* xii. 208, *partly*. D. Ebenaster, *Roxb. Fl. Ind.* ii. 529, *not of Retz.*

South Deccan Peninsula; fide *Beddome*. Assam; *Griffith* (an culta?). Ceylon; alt. 2–5000 ft., frequent.—Distrib. Malaya (*Hiern*).

A large tree; branchlets glabrous. *Leaves* 4 by $1\frac{3}{4}$ in., coriaceous; primary nerves oblique; petiole $\frac{1}{6}$–$\frac{1}{5}$ in. *Male fl.* 3–12 together, almost fascicled on peduncles 0–$\frac{1}{4}$ in.; calyx $\frac{1}{8}$ in., funnel-shaped, nearly glabrous, lobes 4, not reaching half-way down, rounded, glabrous or ciliate-pubescent on the margins; corolla-buds $\frac{1}{2}$ in., narrower upwards, lobed half-way down; filaments minutely pilose, anthers linear glabrous, connective long produced. *Female fl.* solitary, very shortly peduncled; calyx larger than in the male; style 1, stigmas 4; ovary 8-celled. *Fruit* $\frac{3}{4}$ in diam., globose, glabrous or adpressedly pubescent; fruiting calyx a subhemispheric wooden cup, fitting the base of the fruit; below its margin without spread the 4 ovate calyx-lobes.—No specimens seen from Bengal except cultivated. Thwaites sends a variety in which the primary nerves of the leaves are more distant and very oblique.

16. **D. assimilis,** *Bedd. in Madras For. Rep.* 1866–7, 20, t. 1; leaves broadly oblong acuminate glabrous thin reticulating nervation rhomboidal conspicuous, male fl. in short-peduncled cymes, calyx pubescent, corolla tubular glabrous without not clavate in bud, stamens 24–32. D. nigricans, *Dalz. in Hook. Kew Journ.* iv. 110; *Dalz. & Gibs. Bomb. Fl.* 141, *not of Wall. nor of Bedd.* D. Ebenum, *Hiern in Trans. Camb. Phil. Soc.* xii. 208, *partly*.

Malabar; Concan and Canara, *Dalzell*; South Canara, *Beddome*.

Leaves more parallel-sided than in *D. Ebenum*, much thinner in texture, drying black. *Calyx* more pubescent, lobed more than half-way down. *Filaments* glabrous, anthers linear, connective hardly produced. The examples are all male, but the tree seems closely allied to *D. Ebenum* (Beddome), with which Hiern unites it.

17. **D. clavigera,** *Clarke*; leaves elliptic obtusely rhomboid at both ends glabrous coriaceous reticulated nervation obscure, male fl. in small dense cymes, corolla tubular glabrous without clavate in the bud, stamens about 16 glabrous. D. Ebenum, *Hiern in Trans. Camb. Phil. Soc.* xii. 208, *partly*.

Malacca; *Griffith* (Kew Distrib. n. 3635), *Maingay* (n. 971).

Whole plant glabrous, except the minutely ciliate-pilose margin of the calyx. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in. (much larger occur), drying red; petiole $\frac{1}{6}$ in. *Male fl.* 3–16 together in very small subsessile cymes; calyx $\frac{1}{8}$ in., divided deeply; lobes 4, obtuse; corolla (in the bud) $\frac{1}{3}$ in., glabrous, the upper portion containing the lobes much thicker than the tube; anthers oblong, connective very shortly produced. *Female fl.* and fruit unknown.

Sect. III. **Brachyanthos.** *Leaves* alternate. *Flowers* small, 4- (rarely 3- or 5-) merous; males in very small cymes (or in *D. microphylla* almost fascicled), females solitary or (in *D. Kurzii*) in very small cymes. *Calyx* nearly 4-partite, larger in the female, accrescent in fruit. *Corolla* subglobose in the male bud, when expanded urceolate small, glabrate (in *D. Kurzii* cinereous-tomentose). *Stamens* 12–24, glabrous or slightly hairy; anther dehiscing at

first by short slits laterally near the apex of the cells. *Albumen* ruminated or equable.

18. **D. sylvatica,** *Roxb. Cor. Pl.* i. 37, t. 47, and *Fl. Ind.* ii. 537; leaves elliptic or oblong narrowed at both ends nearly glabrous secondary nervation indistinct, male fl. in small cymes, corolla short urceolate glabrate without, female solitary. *A. DC. Prodr.* viii. 231, *excl. var.* β; *Thwaites Enum.* 178; *Bedd. Ic. Pl. Ind. Or.* t. 121, and *For. Man.* 143; *Hiern in Trans. Camb. Phil. Soc.* xii. 161, *not of Wall.*

DECCAN PENINSULA from the CIRCARS and BOMBAY to CEYLON.

A medium-sized tree. *Leaves* 4½ by 2 in., minutely pubescent beneath or glabrous, drying black; petiole ¼ in. *Male fl.* in cymes ½–1 in. long; calyx-lobes $\frac{1}{25}$ in., rounded, minutely hairy; corolla $\frac{1}{10}$ in., lobed half way down; stamens 13–22, glabrous or sparsely pilose; anthers ovate, dehiscing by a short slit near their apex, connective produced lanceolate. *Female fl.* on peduncles ¼–⅓ in., 4–3-merous; calyx-lobes ¼ in., ovate-oblong; corolla ¼–⅓ in.; staminodes 4; ovary 6–8-celled; styles 3, bifid. *Fruit* ½ in. diam., globose, nearly glabrous; fruiting calyx accrescent, lobes spreading, foliaceous, glabrous, nearly flat, striate. *Seeds* 2–8, albumen ruminated.

19. **D. ehretioides,** *Wall. Cat.* 4137; leaves large elliptic base obtuse nearly glabrous reticulating nervation prominent, male fl. in small cymes, corolla urceolate glabrate without, females solitary. *A. DC. Prodr.* viii. 231; *Hiern in Trans. Camb. Phil. Soc.* xii. 162; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 129.

Throughout BRITISH BIRMA, frequent.—DISTRIB. Ava.

A tree, attaining 70 ft. *Leaves* attaining 11 by 6½ in., base rounded or rarely rhomboidal, nearly glabrous when very young, pale (brown when dried) beneath; petiole ⅔ in. *Flowers* nearly as in *D. sylvatica*, the males rather larger; anthers ovate-lanceolate, similar to those of *D. sylvatica*, and similarly dehiscing by a lateral slit from the apex of the cell, which is in this species produced more than half-way down the cell. *Fruit* 1–1⅓ in. diam., globose, smooth.

20. **D. Kurzii,** *Hiern in Trans. Camb. Phil. Soc.* xii. 162; leaves elliptic shortly acuminate glabrous, primary nerves slender distinct very close, female fl. 2–3 together in short-peduncled cymes, corolla-lobes cinereous-tomentose on both sides. *Kurz in Journ. As. Soc.* 1877, pt. ii. 235, and *For. Fl.* ii. 231.

ANDAMAN ISLDS.; frequent, *Kurz*. NICOBARS; Kamorta, *Kurz*.

A tree, attaining 60 ft. (*Kurz*); branchlets pubescent. *Leaves* 3¼ by 1⅓ in., base cuneate, drying black, midrib depressed above; petiole ⅛–⅙ in. *Male fl.* unknown. *Female fl.* 4-merous; peduncles $\frac{1}{20}$–⅛ in., pubescent, bracts small, linear, deciduous; calyx $\frac{1}{10}$ in., lobes deep, elliptic glabrous or nearly so; corolla ⅙–⅕ in., short-campanulate, lobes deep, oblong-ovate; staminodes 4 glabrous; ovary glabrous except at the apex, 4-celled, cells 1-ovuled; styles 2, erect, slender, hairy, long, base connate. *Berries* globular, size of a small cherry, smooth, 4-celled, 4-seeded; albumen equable. Kurz says that the style is simple thick.

21. **D. microphylla,** *Bedd. Ic. Pl. Ind. Or.* t. 218, and *For. Man.* 145; leaves small ovate-oblong cuneate at both ends glabrescent except the midrib beneath, flowers axillary subsessile, calyx-lobes ovate. D. buxifolia, *Hiern in Trans. Camb. Phil. Soc.* xii. 218. D. vaccinioides, *Wall. Cat.* 4130, *as to Penang and Singapore examples*; *Hiern l. c.* 230, *as to all the Malay examples, not of Lindl.* Leucoxylum buxifolium, *Blume Bijd.* 1169; *Choisy Mém. Ternstr.* p. 43, t. 2.

CANARA, MYSORE, BABABOODUN and ANAMALLAY HILLS; *Gibson, Beddome*, &c. MALACCA; *Maingay*, n. 966, *Griffith* (Kew Distrib. n. 3643), *Walker*, &c. PENANG and SINGAPORE, *Wallich*.—DISTRIB. Java, Borneo.

A large tree; branchlets in the Malay glabrescent, in the Malabar subpersistently hirsute. *Leaves* 1¼ by ½–⅔ in., glabrous above, coriaceous, nerves obscure; petiole $\frac{1}{16}$

in. *Male fl.* 1–3 together in a most minute cyme; calyx $\frac{1}{16}$ in., 4-lobed; lobed half-way down, tube glabrate without lobes densely fulvous-pilose near their margins; stamens 16 (in the Indian examples). *Female fl.* solitary; calyx and corolla nearly as of the male; ovary 4-celled, pubescent, cells 1-ovuled; style short, bipartite. *Fruit* $\frac{1}{3}$–$\frac{3}{4}$ by $\frac{1}{6}$–$\frac{1}{3}$ in., short-cylindric, glabrous 1- (rarely 2-) seeded. *Seeds* with albumen not ruminated.—The anthers are exceedingly short, dehiscing at first by a lozenge-shaped opening from the summit, but even at that time a groove is produced from this opening nearly to the base of the cell. *D. vaccinioides* differs in its very narrow calyx-segments.

22. **D. Chloroxylon,** *Roxb. Cor. Pl.* i. 38, t. 49, and *Fl. Ind.* ii. 538; leaves elliptic or obovate-oblong hairy beneath, male fl. subsessile fascicled, calyx small, lobes 4 deep ovate, corolla small urceolate nearly glabrous without. *Wall. Cat.* 4118; *A. DC. Prodr.* viii. 230; *Dalz. & Gibs. Bomb. Fl.* 140; *Hiern in Trans. Camb. Phil. Soc.* xii. 233; *Brand. For. Fl.* 297. D. tomentosa, *Lamk. Encyc.* v. 436, *not of Roxb.* D. capitulata, *Wight Ic.* tt. 1224, 1588 *bis.*

DECCAN PENINSULA from SURAT and ORISSA southwards; frequent.

A middle-sized tree; branches sometimes spinous. *Leaves* 1½ by 1 in., usually narrowed upwards or acute, base cuneate or obtuse, nerves not prominent; petiole $\frac{1}{6}$ in. *Male fl.* 4–10 together, 4-merous; calyx $\frac{1}{10}$ in., lobes ovate, glabrous within; corolla $\frac{1}{6}$ in.; stamens 16, glabrous; anthers opening by small subapical slits, subsequently extending nearly to their base. *Female fl.* solitary, sessile; calyx and corolla as in the male but rather larger; staminodes 7–9; ovary glabrous, styles 4 glabrous. *Fruit* $\frac{1}{3}$ in. diam., globose, glabrous, 2–3-seeded; fruiting calyx $\frac{1}{3}$ in. diam., nearly flat.—Wight says that his *D. capitulata* differed by having the produced connective bipartite, but this does not appear to be so in Wight's own Herbarium specimens. As to *D. glauca*, Rottler (A. DC. Prodr. viii. 238), reduced here doubtfully by Hiern, it is so imperfectly characterised that it may have been *D. montana* or some totally remote species.

SECT. IV. **Ebenus** (Hiern in Trans. Camb. Phil. Soc. xii. 146). *Leaves* alternate, adult glabrous. *Flowers* mostly 4-merous; males in very small cymes or fascicled; females 1–3, sessile. *Calyx* obscurely lobed or nearly entire. *Corolla* narrowly tubular in the bud, fulvous-tomentose without. *Stamens* glabrous. *Albumen* equable.

23. **D. oocarpa,** *Thwaites Enum.* 180; leaves ovate obtusely acuminate glabrous primary nerves oblique secondary little elevated, male fl. fascicled, corolla tubular tomentose without, female calyx subtruncate. *Hiern in Trans. Camb. Phil. Soc.* xii. 171.

MALABAR HILLS; *Law.* CONCAN; *Dalzell.* CEYLON; *Thwaites.*

A middle-sized tree. *Leaves* 4 by 1¾ in., base broadly rhomboid; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Male fl.*: cymes small, 3–7-flowered; calyx $\frac{1}{6}$ in., cylindric, silky; corolla $\frac{1}{3}$ in., 3–4-lobed; stamens 9–12, glabrous. *Female fl.* 1–3 together, subsessile, similar to and scarcely larger than the male; ovary 6–8-celled. *Fruit* 1 by ¾ in., ellipsoid, young narrowly cylindric; fruiting-calyx short funnel-shaped, mouth $\frac{1}{4}$ in. (or more) wide, entire.—Hiern follows Thwaites in reducing here *D. Arnottiana*, Miq.; but Miquel's authentic specimen at Kew is *D. Candolleana.*

24. **D. quæsita,** *Thwaites Enum.* 179; leaves elliptic abruptly acuminate glabrous primary nerves numerous nearly horizontal reticulating nerves conspicuous, male cymes small, corolla tubular minutely closely hairy without. *Bedd. Ic. Pl. Ind. Or.* t. 128 (*nervation bad*), and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 174.

CEYLON; Saffragam, and between Ratnapoora and Galle, *Thwaites.*

A huge tree. *Leaves* 7 by 3¼ in., base broadly rhomboid; petiole $\frac{1}{2}$ in. *Male fl.*: cymes small, 3–9-flowered, pilose; calyx $\frac{1}{4}$ in., tubular, pubescent, obscurely 4–5-lobed;

corolla ½ in., 4–5-lobed; stamens about 16. *Female fl.* solitary, short-peduncled; corolla shortly 5-lobed. *Fruit* 2 in. diam., globose, glabrous; fruiting calyx 1⅓ in. wide, lobes large cordate, reflexed at the sides and base.—Beddome's figure as to the outline of the larger leaves agrees with Thwaites' specimens, but the venation shown in the smaller leaves is particularly unlike them.

SECT. V. **Noltia** (Hiern in Trans. Camb. Phil. Soc. xii. 146, character much widened). *Leaves* alternate, adult glabrous (in *D. stricta* and *D. flavicans* somewhat pubescent). *Flowers* 4- or 5-merous; male fascicled, female sessile or shortly peduncled, solitary or fascicled. *Calyx* distinctly lobed. *Corolla* ovoid-tubular in the bud, densely fulvous- or rufous-tomentose without. *Albumen* (where known) equable.

* *Stamens 4–5, fruit ovoid-conic.*

25. **D. attenuata,** *Thwaites Enum.* 182; leaves oblong acuminate base cuneate glabrous nervation conspicuous above, male fl. sessile clustered, corolla tubular ferruginous-tomentose without, stamens 4–5, fruit ovoid acuminate glabrous. *Bedd. Ic. Pl. Ind. Or.* t. 139, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 182.

CEYLON; Pasdoon Corle, *Thwaites.*

A middle-sized tree. *Leaves* 3¾ by 1 in., coriaceous; primary nerves indistinct, distant, nearly horizontal, secondary fine; petiole ⅛ in. *Male fl.* 3–10 together; calyx $\frac{1}{10}$ in., deeply lobed, hairy on both sides; corolla 1⅙ in., slender; anthers glabrous. *Female fl.* solitary, subsessile; calyx ¼–⅓ in., nearly 4–5-partite; staminodes 4–5; ovary 4-celled, cells 1-ovuled. *Fruit* 1¼ by ⅓ in., very sharply acuminated, 2–3-seeded; calyx-segments in fruit narrow-oblong, foliaceous, ¼ in. long.

26. **D. acuta,** *Thwaites Enum.* 182; leaves oblong-lanceolate acuminate base obtuse or almost rounded glabrous reticulation obscure above, male fl. sessile clustered, corolla tubular densely fulvous-villous without, stamens 4–5, fruit ovoid acuminate. *Hiern in Trans. Camb. Phil. Soc.* xii. 182; *Bedd. For. Man.* 146.

CEYLON; Pasdoon Corle, *Thwaites.*

A middle-sized tree. *Leaves* 9 by 2½ in., broadest near the base, very thick coriaceous; primary nerves nearly horizontal, reticulation usually altogether obscure, sometimes subconspicuous beneath; petiole ⅜ in. *Male fl.* 5–20 together; calyx ⅙ in., lobed more than half-way down, very hairy; corolla ½ in.; stamens glabrous. *Female fl.* sessile, 1–4 together; calyx ⅓ in. or more, lobed nearly to the base, lobes lanceolate, margins little reflexed; ovary 4–6-celled. *Fruit* 1½ in. long, 2–3-seeded.

** *Stamens 12–20, fruit ellipsoid obtuse.*

27. **D. Gardneri,** *Thwaites Enum.* 181; leaves elliptic-lanceolate glabrous, nerves not prominent, male fl. sessile clustered, corolla salvershaped fulvous-tomentose without, calyx-lobes in the female flower very short. *Bedd. Ic. Pl. Ind. Or.* t. 132, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 214. Patonia Walkerii, *Wight Ill.* i. p. 19.

CEYLON; alt. 2000 ft., *Walker, Gardner,* &c.

A middle-sized tree; young shoots soon glabrous. *Leaves* 6½ by 2½ in., base rhomboid or obtuse, shining above, midrib strongly elevated beneath; petiole ¼ in. *Male fl.*: calyx ⅛ in., lobed half-way down, silky; corolla-tube ⅓ in., narrowed upwards, lobes ⅛ in. elliptic acute; stamens 12–16, filaments short, anthers lanceolate linear, connective pilose on the back, hardly produced. *Female fl.* solitary, subsessile; calyx-tube ⅕ in., campanulate, lobes broad-triangular, hardly $\frac{1}{16}$ in. long. *Fruit* nearly 1 in. diam., depressed globose, glabrate; fruiting-calyx cupuliform, thickened, 1¼ in. diam., lobes very short triangular.

28. **D. lanceæfolia,** *Roxb. Cat. Pl. Fl. Ind.* (1813), and *Fl. Ind.* ii. 537; leaves oblong or lanceolate acuminate glabrous coriaceous, male fl. sessile clustered, corolla salvershaped fulvous-tomentose without, calyx-lobes in the female flower ovate with reflexed margins. *A. DC. Prodr.* viii. 232; *Hiern. in Trans. Camb. Phil. Soc.* xii. 213; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 136. D. multiflora, *Wall. Cat.* 4144; *A. DC. l. c.* 231. D. amœna, *Wall. Cat.* 4139; *A. DC. l. c.* 231.

SILHET; *Roxburgh.* KHASIA MTS.; Terrya Ghat, *H. f. & T.*; Mahadeo, *Griffith.* CACHAR; *H. f. & T., Keenan.* MOULMEIN; *Falconer* (fide *Kurz*).

A pretty large tree; branchlets soon glabrous. *Leaves* $6\frac{1}{2}$ by 2 in., base rhomboid or subobtuse, coriaceous; midrib deeply impressed from above, much elevated below; primary nerves oblique, secondary not prominent. *Male fl.*: calyx $\frac{1}{8}$ in., lobes 4, ovate, ferruginous sericeous; corolla in *D. lanceæfolia* $\frac{1}{3}$ in., in *D. multiflora* $\frac{1}{2}$ in., narrowed upwards, lobes $\frac{1}{8}$ in.; stamens about 16, filaments minutely pilose; anthers linear, glabrous or slightly pilose at the base. *Female fl.* solitary, subsessile; calyx $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{5}$–$\frac{1}{4}$ in., lobes cordate-ovate densely fulvous tomentose, margins recurved even before the corolla is expanded; corolla nearly as of the male; ovary 8-celled, hairy. *Fruit* 1 by $\frac{2}{3}$ in., ovoid or subglobose ferruginous-villous; fruiting calyx 1 in. diam., with thickened tube and spreading lobes.

VAR. *amœna*, Wall. Cat. 4139 (sp.); leaves oblong-lanceolate widest very near the base, calyx-lobes in the female smaller without recurved margins. *A. DC. Prodr.* viii. 231.–Khasia; *Wallich.* Referred here by Hiern, but the material is very scanty (not showing either the male inflorescence or fruit); and the leaves and female calyx appear more like those of *D. undulata*, Wall. var. *macrophylla*.

29. **D. sapotoides,** *Kurz*: *Hiern in Trans. Camb. Phil. Soc.* xii. 206; leaves large obovate-oblong shortly acuminate glabrate, male fl. sessile clustered, calyx-lobes broad reflex-margined, corolla salvershaped, tube fulvous-pilose without, lobes glabrate. *Kurz in Journ. As. Soc.* 1877, pt. ii. 236; *For. Fl.* ii. 136.

BRITISH BIRMA; eastern slopes of the Pegu Yomah, frequent, *Kurz.*

A tree, attaining 50 ft. (*Kurz*); branchlets soon glabrous. *Leaves* 11 by $3\frac{1}{2}$ in., base cuneate or subobtuse, coriaceous, midrib beneath obscurely silky otherwise ultimately glabrous; primary nerves oblique, secondary not conspicuous; petiole $\frac{1}{4}$ in. *Male fl.* densely clustered, bracts $\frac{1}{8}$ in., ovate; calyx $\frac{1}{4}$ in., openly campanulate, deeply lobed, fulvous-silky; corolla-buds $\frac{1}{2}$ in., tube densely fulvous-silky at least on the 4 angles; stamens 15–16, glabrous. *Female fl.* (from Kurz's description) nearly as of the male; staminodes 12; ovary glabrous, style tolerably long, 4-cleft.—Resembles *D. flavicans* but has much larger leaves; the specimens do not exhibit the long bracts conspicuous in *D. flavicans*, nor does Kurz notice that such ever occur.

30. **D. flavicans,** *Hiern in Trans. Camb. Phil. Soc.* xii. 205; leaves elliptic acuminate to an obtuse apex glabrescent, male fl. clustered subsessile, calyx-lobes broad reflex-margined, corolla salvershaped fulvous-pilose without, sometimes glabrate towards the apex, female flowers 1–3 together on $\frac{1}{8}$–$\frac{1}{6}$ in. ferruginous-villous pedicels. *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 135. Guatteria ? flavicans, *Wall. Cat.* 7295.—Ebenacea sp. 2, *Griff. Notul.* iv. 291.

MERGUI and TAVOY; *Griffith.* TENASSERIM; *Helfer.* MALACCA; *Griffith* (*Maingay*, n. 972, *male specimens only*).

A small tree; branches soon glabrescent. *Leaves* $5\frac{1}{2}$ by 2 in., base rhomboid or subobtuse, midrib beneath obscurely pubescent, otherwise at length glabrous, coriaceous, when dried yellowish-green above, cinnamoneous-brown beneath; primary nerves distant, oblique, secondary obscure; petiole $\frac{1}{5}$–$\frac{1}{6}$ in. *Male fl.*; pedicels $\frac{1}{20}$ in.; bracts $\frac{1}{3}$ in., oblong; calyx $\frac{1}{5}$ in. long and broad, lobes ovate acute ferruginous-pubescent auriculate; corolla nearly $\frac{1}{2}$ in., slender, lobed half-way down; stamens 14–20, glabrous. *Female fl.*: bracts as of the male; calyx as of the male, slightly

larger, $\frac{1}{4}$ in. long and broad, with a distinct tube; corolla as of the male. *Fruit* $\frac{3}{4}$ by $\frac{1}{3}$ in., oblong cylindric, glabrescent; fruiting calyx very slightly enlarged.—Female flowers and fruit here are described from Griffith's examples; but by Hiern from Maingay's n. 972 female (see next species).

31. **D. decipiens,** *Clarke*; leaves elliptic acuminate glabrous, female flowers sessile solitary, calyx 4-partite, lobes foliaceous margins hardly reflexed little hairy, corolla salvershaped tube 4-gonal densely fulvous-silky. D. flavicans, *Hiern in Trans. Camb. Phil. Soc.* xii. 205, *as to the female plant partly.*

MALACCA; *Maingay* (n. 972, *female only*).

Closely resembling *D. flavicans* female, and taken as part of it by Hiern. *Female calyx* (shortly after flowering); lobes $\frac{1}{3}$ in. and upwards, ovate acute, with scattered fulvous hairs or nearly glabrous, tube 0 or obscure. *Fruit* 1 in., cylindric, glabrous; fruiting calyx unchanged.—This does not show the bracts conspicuous in every example of *D. flavicans.* Helfer's n. 3640, from Tenasserim, a very poor specimen with young male buds, might be the male of *D. decipiens*, or *D. flavicans* as proposed doubtfully by Hiern. Helfer's n. 423, doubtfully referred here by Hiern l. c., has totally different leaves and is quite distinct, may be *D. lucida*, Wall.

32. **D. stricta,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 539; leaves elliptic-lanceolate acuminate sparsely pilose beneath, male fl. subsessile in small clusters, corolla salvershaped tomentose without, fruit ellipsoid glabrous narrowed at the base. *Wall. Cat.* 4121; *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 201; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 137, *as to descript. only.*

EAST BENGAL; Silhet and Comilla, *Roxburgh* (Hort. Calc.); (*Griffith*, Kew Distrib. n. 3624).

A tall slender conical tree with straight trunk (*Roxburgh*); branchlets soon glabrous. *Leaves* 3 by $1\frac{1}{4}$ in., base obtuse, ultimately glabrous above except the midrib, coriaceous; primary nerves oblique not prominent, secondary obscure; petiole $\frac{1}{8}$ in. *Male fl.* 3–6 together; bracts $\frac{1}{16}$ in., numerous, ovate; calyx $\frac{1}{10}$ in., deeply lobed, lobes ovate apiculate; corolla-tube $\frac{1}{5}$ in., narrowed upwards, lobes 4, $\frac{1}{6}$ in., ovate; stamens 14–16, glabrous. *Female fl.* unknown. *Fruit* $1\frac{1}{4}$ by $\frac{3}{4}$–1 in., solitary; peduncle $\frac{1}{4}$ in.; fruiting-calyx small, lobes $\frac{1}{6}$ in. long and broad, ovate.

SECT. VI. **Melonia** (Hiern in Trans. Camb. Phil. Soc. xii. 146, in chief part). *Leaves* alternate or subopposite. *Flowers* 4–5-merous; male cymose or fascicled, female solitary or fascicled. *Calyx* deeply lobed or tubular-campanulate, often much larger dissimilar in the female. *Corolla* in the bud ovoid-tubular, densely fulvous- or rufous-sericeous without. *Albumen* ruminated (where known).

* *Leaves when mature more or less hairy beneath, male flowers distinctly cymose with tubular-campanulate calyx.*

33. **D. Tupru,** *Buch-Ham. Journ.* i. 183, and *in Trans. Linn. Soc.* xv. 112, *not of Hiern*; leaves (not large) elliptic obtuse at both ends reticulating nerves raised on the upper surface, male fl. cymose, calyx short-cylindric, corolla yellow-woolly without, female solitary short-peduncled with 4–5-gonal calyx. D. rubiginosa, *Roth Nov. Sp.* 385; *A. DC. Prodr.* viii. 239. D. exsculpta, *Dalz. & Gibs. Bomb. Fl.* 142, *syn. excl. not of Ham.* D. melanoxylon, *Hiern in Trans. Camb. Phil. Soc.* xii. 159, *in great part.*

WEST DECCAN PENINSULA; from the Concan to Mysore, *Hamilton*, &c. JUBBULPORE; *Griffith.*

A small tree; branchlets woolly. *Leaves* $3\frac{1}{2}$ by 2 in. (rarely so large even when mature), alternate and subopposite, base mostly rounded or subcordate, or if obtusely

cuneate not decurrent on the petiole; fulvous woolly when young, ultimately glabrescent above, coriaceous; secondary nerves slender; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{2}$-$1\frac{1}{2}$ in., fulvous-hairy; calyx-tube $\frac{1}{8}$ in., terete; teeth $\frac{1}{12}$ in., triangular; corolla $\frac{1}{3}$ in., very woolly without; stamens 12; filaments and anther-cells glabrous, connective fulvous-pilose behind, scarcely produced. *Female fl.*: pedicels $\frac{1}{10}$ in.; calyx (at flower time) $\frac{1}{5}$ by $\frac{1}{4}$ in., lobed nearly to the base; lobes broad ovate with recurved margin; corolla $\frac{1}{2}$ in.; styles 2–3, bifid at the apex. *Berry* $\frac{3}{4}$ in. diam., globose, smooth; often 4-seeded.—Hamilton says that the calyx of the male (in *D. Tupru*) is like that of the female; but this must have been a slip, as his authentic specimen in the British Museum shows.

34. **D. tomentosa,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 532; leaves large ovate from a rounded base reticulated nerves impressed on the upper surface, male fl. cymose, calyx funnel-shaped, corolla ferruginous-lanate without, female solitary short-peduncled with 4–5-gonal calyx. *Wight Ic.* tt. 182, 183, *not of Poir.* D. exsculpta, *Ham. in Trans. Linn. Soc.* xv. 110; *A. DC. Prodr.* viii. 223, *not of Dalz. nor of Bedd.* D. insculpta, *Ham. l. c.* 112; *A. DC. l. c.* D. Roylei, *A. DC. l. c.* 239.

BENGAL; *Roxburgh, Hamilton.* BEHAR; *H. f. & T.* CHOTA NAGPORE; *Clarke.* BUNDELCUND; *Edgeworth.* OUDH; *R. Thompson.*

A small, crooked tree. *Leaves* alternate and opposite, 8 by 5 in., sometimes 13 in., commonly broad-ovate, rarely ovate acute, young very hairy, mature glabrous above hairy beneath, base cordate or rounded (rarely obtusely cuneate), ultimately glabrescent on both surfaces, very coriaceous; secondary nerves impressed as broad furrows, giving the leaf a wrinkled and thickened aspect; petiole $\frac{1}{4}$ in. *Flowers* nearly as in *D. Tupru*, but rather larger; calyx of the male widened at the mouth, teeth ovate often $\frac{1}{10}$–$\frac{1}{8}$ in.; stamens about 16, filaments glabrous, connective fulvous-pilose on the back, shortly produced. *Berry* as of *D. Tupru*, but rather larger.

35. **D. melanoxylon,** *Roxb. Cor. Pl.* 36, t. 46, and *Fl. Ind.* iii. 530; leaves elliptic narrowed at both ends reticulating nerves raised on the upper surface, male fl. cymose, calyx short cylindric, corolla yellow-lanate without, female solitary short-peduncled with 4–5-gonal calyx. *A. DC. Prodr.* viii. 224; *Hiern in Trans. Camb. Phil. Soc.* xii. 159, *partly*; *Brand. For. Fl.* 294, *partly, not of Blume.* D. Wightiana, *Wall. Cat.* 4406; *A. DC. l. c.* 223; *Bedd. Fl. Sylv.* t. 67. D. dubia, *Wall. Cat.* 4407; *A. DC. l. c.* 223; *Wight Ic.* t. 1223.

DECCAN PENINSULA and CEYLON; frequent.

A tree, attaining sometimes 60–80 ft., or a shrub. *Leaves* 4 by $1\frac{3}{4}$ in., alternate or rarely subopposite, base nearly always narrowed, or if broad yet with a narrow decurrence on the petiole. Otherwise as *D. tomentosa.*

VAR. *Beddomei*; calyx of the female (as of the male) tubular terete with small teeth. D. exsculpta, *Bedd. Fl. Sylv.* t. 66, *not of Ham.* Not seen. If the figure of the female calyx is incorrect, this tree will be *D. menaloxylon*, Roxb. type (not *D. tomentosa* as Hiern doubtfully suggests).

36. **D. Packmanni,** *Clarke*; all young parts ferruginous-woolly, leaves elliptic-oblong acute, male fl. pedicelled by threes on short peduncles 5-merous, stamens 16 paired, anthers oblong-lanceolate fulvous-pilose, connective not produced.

TAVOY; *Packmann* (from Herb. Wight).

Branchlets slender, densely ferruginous-woolly, finally glabrate. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., alternate, base obtuse, ferruginous-woolly on both surfaces, ultimately nearly glabrous except the midrib beneath; primary nerves slender, reticulating nerves close distinct; petiole $\frac{1}{8}$ in. *Male fl.*: peduncles $\frac{1}{4}$ in., pedicels $\frac{1}{10}$–$\frac{1}{6}$ in.; calyx $\frac{1}{6}$ by $\frac{1}{6}$ in., shortly campanulate, lobed half-way down; lobes ovate, ferruginous-villous on both sides; corolla $\frac{1}{4}$ in. shortly campanulate, deeply lobed, densely ferruginous-villous without; filaments glabrous below, fulvous-pilose upwards, anther-cells and connec-

tive with fulvous hairs. *Female fl.* not seen.—Not taken up by Hiern, who has merely noted on the sheet "cfr. *D. melanoxylon*, Roxb.;" it is near *D. Tupru*, Ham., the leaves more acute, more finely reticulated.

37. **D. burmanica,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 73; leaves oblong obtusely cuneate at both ends mature reticulated above by the impressed nerves, male fl. in small peduncled cymes, corolla fulvous-tomentose without, stamens 12–16 glabrous. *Hiern in Trans. Camb. Phil. Soc.* xii. 166; *Kurz in Journ. As. Soc.* 1877, pt. ii. 235, and *For. Fl.* ii. 133.

PROME, PEGU and MARTABAN; *McLelland, Kurz.*—DISTRIB. Ava.

A tree, attaining 60 ft. (Kurz); all the young parts fulvous-pubescent. *Leaves* 3½ by 1⅓ in., alternate, hairy on both sides, ultimately nearly glabrous except near the midrib beneath, coriaceous; primary nerves oblique, indistinct; petiole ⅛–⅙ in. *Male fl.*: peduncle ⅛–¼ in., cymes 3–8-flowered; calyx ⅛–⅙ in., lobed less than half-way down; corolla ¼–⅓ in.; anthers linear. *Female fl.*: solitary, peduncles ⅙–¼ in.; calyx nearly ¼ in., lobes broadly cordate-ovate with recurved margins; staminodes 8. *Fruit* 1–1½ in. diam., globose, glabrous, 2–4-seeded. *Albumen* ruminated.

** *Leaves when mature glabrescent beneath, drying reddish or brownish, male flowers fascicled with deeply-lobed calyx.*

38. **D. insignis,** *Thwaites Enum.* 180; leaves often subopposite large ovate or oblong glabrous, male fl. clustered subsessile, corolla-buds narrower upwards, stamens 14–20. *Bedd. Ic. Pl. Ind. Or.* t. 130, and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 157.

ANAMALLAYS; alt. 2–3000 ft., *Beddome.* CEYLON; alt. 2000 ft., *Thwaites.*

A very large tree. *Leaves* subopposite and alternate, 13 by 6 in., or 8 by 3¼ in., acuminate, base rounded or cuneate, coriaceous; secondary nerves strong, tertiary manifest; petiole ¼ in. *Male fl.* 4-merous; calyx ⅛–⅙ in., campanulate, shortly 4-fid, minutely pubescent; corolla ⅓ in., tubular, tomentose, silky without, lobes short; filaments and anthers glabrous or with very few scattered hairs, unequal. *Female fl.* 1–3 together, axillary, subsessile; ovary 8-celled. *Fruit* 1½ in. diam., globose, smooth; calyx accrescent, tube forming a woody shallow cup 1¼ in. wide. *Seeds* ¾ by ⅓–½ in.; albumen ruminated.

39. **D. oppositifolia,** *Thwaites Enum.* 181; leaves often subopposite elliptic shortly obtusely acuminate glabrous, male flowers subsessile few together, corolla-buds broader upwards, stamens about 8. *Bedd. Ic. Pl. Ind. Or.* t. 131, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 157.

CEYLON; Hinidoon Corle, alt. 1000 ft., *Thwaites.*

A middle-sized tree. *Leaves* 4 by 2 in., broadly rhomboid or almost rounded, coriaceous; secondary nerves obscure, tertiary indistinguishable; petiole $\frac{1}{10}$–⅙ in. *Male fl.*: calyx $\frac{1}{12}$ in., nearly glabrous, acutely 4-lobed half-way down; corolla ⅓ in., ferruginous-villous without, lobed one-third the way down; filaments very unequal. *Female fl.* (and fruit) unknown.

40. **D. hirsuta,** *Linn. f. Suppl.* 440; leaves elliptic or oblong abruptly acuminate coriaceous young hirsute beneath with short basifixed hairs, male fl. densely fascicled, corolla tubular ferruginous-tomentose without, stamens 5 glabrous, fruit rufous-tomentose 6–10-seeded. *A. DC. Prodr.* viii. 223; *Thwaites Enum.* 181; *Bedd. Ic. Pl. Ind. Or.* t. 137, and *For. Man.* 146; *Hiern in Trans. Camb. Phil. Soc.* xii. 163, *partly, excl. syn.* D. lucida.

CEYLON; Saffragam and Galle, *Thwaites.*

A middle-sized tree; branchlets and inflorescence ferruginous-tomentose. *Leaves* 4½ by 1½–2 in., alternate, base broadly rhomboid or almost rounded, ultimately nearly glabrous, coriaceous; nervation very obscure; petiole ⅕ in. *Male fl.*: calyx $\frac{1}{10}$ in., terete, 5-fid half-way down; corolla ¼ in. *Female fl.* 1–3 together, subsessile; calyx

$\frac{1}{4}$ in., broad, deeply 5-lobed; corolla $\frac{1}{4}$–$\frac{1}{3}$ in.; staminodes 5; ovary usually 10-celled. *Fruit* 1 by $\frac{3}{4}$ in., ellipsoid; calyx densely ferruginous-silky within.

41. **D. Candolleana,** *Wight Ic.* tt. 1221–2; leaves oblong shortly cuneate at both ends coriaceous glabrescent, male fl. densely fascicled, corolla tubular yellow-tomentose without, stamens 10 glabrous, fruit glabrous usually 5–4-seeded. *Dalz. & Gibs. Bomb. Fl.* 142; *Bedd. For. Man.* 144, *not of Thwaites.* D. hirsuta, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly.* D. Arnottiana, *Miq. in Pl. Hohenack.* n. 562. D. canarica, *Bedd. Ic. Pl. Ind. Or.* t. 134, and *For. Man.* 145. D. oligandra, *Bedd. Rep. Forests Madras,* 1867, 68.

DECCAN PENINSULA; from the Concan to Quilon and Courtallum, common.

Closely resembling *D. hirsuta.* *Leaves* 4–7 in., young with closely adpressed fulvous hairs adfixed by their middle beneath, usually early glabrescent, without the acuminated apex of *D. hirsuta.* *Male fl.* rather larger; calyx $\frac{1}{5}$ in.; corolla $\frac{1}{3}$ in.; stamens in 5 pairs, filaments of each pair attached one in front of the other at the base. *Female fl.* rather larger than in *D. hirsuta,* 1–3 together or sometimes 6–10; staminodes 5, or 10 in the form *D. canarica,* Bedd.

42. **D. nilagirica,** *Bedd. Ic. Pl. Ind. Or.* t. 136, and *For. Man.* 144; leaves oblong narrowed at both ends, young densely rufous-tomentose beneath, male fl. densely fascicled, corolla tubular tomentose without, stamens 16, filaments hairy.

NILGHERRIES; Sispara Ghat, *Beddome.*

Female fl. 1–2 together; staminodes 8 in one series; ovary 8-celled; fruit globose, depressed, size of a small greengage.—Not seen; appears allied to *D. Candolleana* as Beddome states, rather than to *D. lucida* as suggested by Hiern.

43. **D. Moonii,** *Thwaites Enum.* 182; leaves large oblong coriaceous glabrescent, male fl. densely fascicled, corolla tubular densely rufous-villous without, stamens 5–8 glabrous, female calyx wide-tubular, fruit glabrate 6–10-seeded. *Bedd. Ic. Pl. Ind. Or.* t. 138, and *For. Man.* 146. D. hirsuta, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly.*

CEYLON; Caltura, *Moon*; Pasdoon Corle, *Thwaites.*

Leaves 11 by $3\frac{1}{4}$ in., base broad or rounded, primary nerves numerous sub-horizontal obscure. *Male fl.* nearly as of *D. hirsuta.* *Female fl.*: calyx-tube at flower time $\frac{1}{5}$ in. long and broad, slightly wider upwards, lobes hardly so long as the tube. *Fruit* $1\frac{1}{4}$ in. diam., globose.—Closely allied to *D. hirsuta,* the young leaves being similarly hairy beneath. The female calyx however differs strikingly.

44. **D. Thwaitesii,** *Bedd. Ic. Pl. Ind. Or.* t. 135, and *For. Man.* 144; leaves lanceolate acuminate coriaceous glabrescent, flowers fascicled, corolla intensely rufous-tomentose without, stamens 10–12 connective fulvous-pilose its whole length, fruit rufous-tomentose usually 4-seeded. D. Candolleana, *Thwaites Enum.* 181, *not of Wight.* D. hirsuta, *Hiern in Trans. Camb. Phil. Soc.* xii. 164, *partly.*

CEYLON; Saffragam and Hinidoon Corle, *Thwaites.*

Resembling *D. hirsuta* in the shape and texture of the leaves and in the fruit. Young leaves intensely red-tomentose, soon glabrescent. *Male fl.*: calyx $\frac{1}{6}$ in., lobes $\frac{1}{12}$ in., triangular; hairs on the connective numerous, short, extending to the shortly-produced apex (the two long ciliæ depicted by Beddome are not found in Thwaites' authentic examples). *Fruit* $\frac{5}{8}$ in. diam., subglobose.

*** *Leaves alternate, early glabrous, drying blackish, male flowers distinctly cymose with shortly-lobed calyx, fruiting calyx strongly plicate.*

45. **D. affinis,** *Thwaites Enum.* 179; leaves oblong narrowed at both ends early glabrescent reticulatating nerves prominent, male cymes peduncled, calyx

with hairs fixed by their middle soon glabrescent, corolla tubular fulvous-tomentose without, stamens 8–9. *Bedd. Ic. Pl. Ind. Or.* t. 127, and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 169, *partly.*

TINNEVELLY HILLS; *Beddome.* CEYLON; between Kandy and Badulla, *Thwaites.*

A middle-sized tree; branchlets glabrous except the tips. *Leaves* 3¾ by 1⅓ in., apex obtuse, when very young with scattered hairs fixed by their middle; petiole ⅓ in. *Male fl.*: peduncles ⅛–⅕ in., 5–10-flowered, soon glabrate; calyx ⅛ in., campanulate-tubular, distinctly veined, teeth minute; stamens nearly glabrous, anthers linear, connective fulvous-pilose below on the back, apex shortly produced. *Female fl.* solitary on peduncles ⅛ in.; calyx ¼ by ⅓ in., early glabrescent; corolla ¼ in., tubular, narrowed at the mouth, lobes broad ovate mucronate, nearly glabrous within. *Fruit* 1 in. diam., globose, glabrous, usually 4-seeded. *Albumen* ruminated (Thwaites).

46. **D. crumenata,** *Thwaites Enum.* 179; leaves elliptic obtuse at both ends early glabrous reticulating nerves prominent, male cymes small, calyx subtomentose with basifixed hairs, corolla tubular fulvous-hirsute without, stamens about 12. *Bedd. Ic. Pl. Ind. Or.* t. 126, and *For. Man.* 145; *Hiern in Trans. Camb. Phil. Soc.* xii. 169.

CEYLON; Central Province, alt. 2–4000 ft., *Thwaites.*

A large tree. *Leaves* 2½ by 1½ in.; but in another example 3 by ¾ in. resembling those of *D. affinis*; this example is in ripe fruit and may be *D. affinis* mixed in the mounting perhaps. *Female fl.*: peduncles and calyces somewhat persistently subtomentose with basifixed hairs; corolla-tube ¼ in., lobes broad, rounded, plicate, auriculate, densely tomentose within. Otherwise in all respects as *D. affinis*, of which further material may prove this a variety.

47. **D. opaca,** *Clarke*; leaves elliptic cuneate at both ends primary nerves thin oblique secondary obscure, male cymes very small, calyx densely sericeous with basifixed hairs, corolla short-tubular tomentose without, stamens about 16. D. affinis, *Hiern in Trans. Camb. Phil. Soc.* xii. 169, *partly, not of Thwaites.*

CEYLON; *Thwaites.*

Branchlets terete; bark very smooth. *Leaves* 3 by 1 in., subobtuse, very opaque, minutely pilose with basifixed hairs, when young soon glabrous; petiole ⅕ in. *Male fl.*: cymes almost reduced to fascicles; calyx $\frac{1}{10}$ in., teeth small; corolla ⅙–⅕ in., very deeply lobed; stamens glabrous, anthers lanceolate.—Hiern has widened the diagnosis of *D. affinis*, so as to include in it this solitary male example of Thwaites, which differs in too many points; the texture nervation and indumentum of the leaves, the very deeply-lobed male corolla and number of stamens. It may not belong to this section of the genus.

SECT. VII. **Argophyllum.** *Leaves* alternate, usually large, glabrous above, shining, coriaceous. *Flowers* 4–5-merous; males in small cymes, females solitary or few together, scarcely pedicellate. *Calyx* deeply lobed, often dissimilar in the female. *Corolla* in the bud ovoid-tubular, densely fulvous- or rufous-sericeous without. *Stamens* usually 16 (12–20). *Albumen* (where known) equable.

48. **D. oleifolia,** *Wall. Cat.* 4128; leaves oblong obtusely acuminate, nerves above obscure, male cymes small few-fld., calyx glabrous without densely fulvo-tomentose within, corolla widely tubular fulvous-tomentose without. *A. DC. Prodr.* viii. 239; *Kurz in Journ. As. Soc.* 1871, pt. ii. 72, 1877, pt. ii. 235, and *For. Fl.* ii. 132; *Hiern in Trans. Camb. Phil. Soc.* xii. 204.

AMHERST; *Wallich.* PEGU; *Brandis.* MARTABAN and TENASSERIM; frequent, *Kurz.*—DISTRIB. Java.

A tree, attaining 60 ft. (*Kurz*); branchlets soon glabrous. *Leaves* 6½ by 2 in., opaque, coriaceous, nerves beneath very closely but obscurely reticulate; petiole ¼ in.

Male fl. about 3 together, in very small cymes, 4-merous; calyx $\frac{1}{4}$ in., lobes wide acute; corolla-tube $\frac{1}{4}$ in. and upwards, lobes short round; stamens 20. *Female fl.* solitary, on very short peduncles (*Kurz*). *Fruit* $\frac{3}{5}$ in. diam., globose, fulvous-pubescent; fruiting-calyx $\frac{1}{4}$ in., 4-fid, in one case 3-fid, tomentose within, lobes ovate-deltoid.

49. **D. undulata,** *Wall. Cat.* 4136; leaves broadly oblong cuneate at the base glabrous, nerves strongly elevated beneath, male flowers in very short densely ferruginous cymes, corolla tubular densely ferruginous without, stamens about 16 nearly glabrous except the connective. *A. DC. Prodr.* viii. 233; *Hiern in Trans. Camb. Phil. Soc.* xii. 216, *partly*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 23, and *For. Fl.* ii. 135, *partly*.

AMHERST; *Wallich.* MERGUI; *Griffith.* MALACCA; *Griffith* (Kew Distrib. n. 3636).

A large tree (*Kurz*); branchlets soon glabrous. *Leaves* 8 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., shortly acuminate or acute, coriaceous, nerves somewhat impressed above; petiole $\frac{1}{3}$ in. *Male fl.*: cymes less than $\frac{1}{4}$ in.; bracts $\frac{1}{10}$ in., triangular; calyx nearly $\frac{1}{6}$ in. long and broad, lobes 4, short, broad-triangular; corolla $\frac{1}{3}$ in., lobed half-way down; filaments nearly glabrous, anthers linear, connective villous with fulvous ascending hairs, hardly produced above the anther. *Female fl.* solitary, shortly peduncled; calyx soon ob-pyramidal enlarged, teeth broadly triangular, incurved over the young fruit, margins of the lobes not reflexed. *Fruit* 1–$1\frac{1}{4}$ by $\frac{3}{4}$–1 in., apex remarkably truncate, fulvous-villous; fruiting calyx much thickened, woody, not plicate nor reflexed.—Much of the material referred to this species by Hiern is *D. lucida*, Wall.

VAR. *macrophylla*, Wall. Cat. 4141 (sp.), not of Blume; leaves 14 by $4\frac{3}{4}$ in. much acuminated, nerves of the upper surface not impressed.—Tavoy; *Wallich, Packman.* Mergui; *Griffith* (Kew Distrib. n. 3629).—Fruit not seen; *fide* Hiern larger than that of *D. undulata*, typ.; but it may be feared than Hiern attributed to *D. undulata* the much smaller globose fruit of *D. lucida* (marked by him *D. undulata*), and supposed the large truncate fruits to belong to *D. macrophylla.*

50. **D. pachyphylla,** *Clarke*; leaves elliptic or oblong coriaceous glabrous base rounded, male fl. in small ferruginous-villous cymes, corolla tubular rusty-tomentose beneath, stamens about 12 nearly glabrous except the connective. D. undulata, *var.* macrophylla, *Hiern in Trans. Camb. Phil. Soc.* xii. 215 (*neither* D. undulata *nor* D. macrophylla, *Wall.*).

MALACCA; *Maingay* (n. 974).

Branchlets thick, soon glabrous. *Leaves* 7 by $2\frac{1}{2}$ in., acute, midrib much elevated beneath, other nerves inconspicuous, very smooth shining above; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{4}$–1 in., often compound; bracts $\frac{1}{10}$ in. ovate; calyx $\frac{1}{8}$–$\frac{1}{6}$ by $\frac{1}{8}$ in., lobed half-way down, lobes 4 oblong; corolla $\frac{1}{2}$ in., tube narrowed upwards, lobes hardly $\frac{1}{8}$ in., small oblong; stamens nearly as of *D. undulata*. *Female fl.* not seen.—Allied no doubt to *D. undulata*, but the corolla differs much, neither do the leaves agree.

51. **D. lucida,** *Wall. Cat.* 4127; leaves oblong narrowed at both ends coriaceous glabrous, male fl. sessile fascicled, corolla tubular yellow-tomentose without, stamens 12–14, anthers and connectives glabrous filaments densely pilose. *A. DC. Prodr.* viii. 233. D. undulata, *Hiern in Trans. Camb. Phil. Soc.* xii. 215, *partly, not of Wall.* Diospyros sp., *Griff. Notul.* iv. 288.

SINGAPORE; *Wallich.* MALACCA; *Griffith* (Kew Distrib. n. 3637, n. 3619, not Helfer under same Distrib. n.); *Maingay* (nn. 970, 973, 977).

Leaves 4 by $1\frac{1}{2}$ in., soon glabrescent, primary nerves not numerous nor prominent, reticulating nerves beneath little elevated; petiole $\frac{1}{6}$–$\frac{1}{5}$ in. *Male fl.*: calyx $\frac{1}{8}$ in. lobed half-way down; corolla nearly $\frac{1}{2}$ in., lobed scarcely half-way down, buds narrower upwards. *Female fl.* 1–2 together, subsessile; calyx $\frac{1}{5}$ by $\frac{1}{4}$ in., divided nearly to the base, lobes broad-ovate with recurved margins; corolla nearly $\frac{1}{2}$ in. *Fruit* $\frac{3}{4}$ in. diam., globose, umbonate at the apex, hairy nearly till ripe, 4–6-seeded. *Albumen* equable.

52. **D. Helferi,** *Clarke*; leaves oblong obtuse apiculate base acute glabrescent reticulating nerves prominent, female fl. 1–3 together sessile, calyx-lobes deep with reflexed margins, corolla rufous-hirsute without. D. Moonii?, *Hiern in Trans. Camb. Phil. Soc.* xii. 164.

TENASSERIM (or Andamans); *Helfer*, n. 3632.—DISTRIB. Cambodia.

Branchlets rufous-tomentose. *Leaves* 6 by $2\frac{1}{2}$ in., broadly oblong, parallel-sided, tip shortly cuneate, base broad, shortly suddenly attenuate, narrowed into the petiole, ferruginous-pilose beneath when young; primary nerves numerous, subhorizontal, much reticulated; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Male fl.* unknown. *Female fl.* usually 3 together sessile on thick peduncles scarcely $\frac{1}{20}$ in. long; calyx nearly $\frac{1}{3}$ in., almost 5-partite, lobes ovate-oblong; corolla nearly $\frac{1}{2}$ in. *Fruit* (imperfectly ripe) $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid, glabrous; fruiting calyx much enlarged, plicate, with much-reflexed margins auriculated at the sinus.—Affinity doubtful, but cannot be *D. Moonii*; the prominently reticulated nerves of the leaves and the female calyx differ.

53. **D. argentea,** *Griff. Notul.* iv. 288; leaves large oblong acute glistening silky beneath, male fl. in stout dense cymes, stamens hairy, fruit solitary hairy. *Hiern in Trans. Camb. Phil. Soc.* xii. 262.

MALACCA; *Griffith* (Kew Distrib. n. 3625), *Maingay* (n. 968).

Branchlets stout, with subpersistent yellowish hair. *Leaves* 10 by $2\frac{1}{2}$–3 in., base rounded, glabrous above, densely villous with fulvous or white soft hairs beneath, at length glabrate; nerves obscure, midrib impressed above; petiole $\frac{1}{4}$ in. *Male fl.*: cymes $\frac{1}{2}$ in., 3–10-flowered; bracts $\frac{1}{5}$ in., ovate; calyx $\frac{1}{4}$ in., deeply 4-lobed, villous; corolla $\frac{1}{3}$ in., tubular, lobed half-way down, very villous without; stamens 22–24. *Female fl.* solitary, peduncles $\frac{1}{5}$ in.; calyx $\frac{1}{2}$ in., campanulate, lobes ovate; corolla $\frac{2}{3}$ in.; staminodes 4–5; ovary 4-celled, 8-ovuled, densely hairy; styles 4, hairy, erect. *Fruit* $2\frac{1}{2}$ by $1\frac{3}{4}$ in., ellipsoid, 8-celled; fruiting calyx greatly enlarged, lobes $1\frac{1}{2}$ in., oblong, densely softly villous. *Seeds* 6–8, $1\frac{1}{2}$ by $\frac{1}{3}$ in., albumen horny.—*D. discolor*, Willd. (A. DC. Prodr. viii. 235), a Philippine species, greatly resembles *D. argentea*, but has glabrous stamens; it is in the collections of Wallich and Maingay, but is supposed only cultivated in India.

SECT. VIII. **Horsfieldia:** as Sect. VII., except that the female flowers are distinctly (though often shortly) cymose.

54. **D. oblonga,** *Wall. Cat.* 4124; leaves large oblong acuminate glabrous, female flowers crowded in very short cymes 5-merous tomentose with black hairs intermixed. *A. DC. Prodr.* viii. 243; *Hiern in Trans. Camb. Phil. Soc.* xii. 243.

PENANG; *Wallich*. SINGAPORE; *Maingay* (n. 967).

Branchlets stout, glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{3}{4}$ in., base obtuse or almost rounded, coriaceous; primary nerves numerous, nearly horizontal, reticulating nerves inconspicuous; petiole $\frac{1}{4}$ in. *Male fl.* not known. *Female fl.* 1–5 together; calyx $\frac{1}{4}$–$\frac{1}{3}$ in., deeply lobed, lobes ovate-oblong, auriculate, subplicate; corolla $\frac{1}{3}$ in., densely hairy without, deeply lobed; staminodes 5; ovary 10-celled, ferruginous-hairy. *Fruit* $\frac{2}{3}$ in. diam., globose, glabrate; calyx $\frac{3}{4}$ in. across, lobes auriculate. *Albumen* horny, not ruminated.

55. **D. ramiflora,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 535; leaves large broadly oblong acute glabrous, male fl. in short cymes, female in many-flowered compound much larger cymes. *Wall. Cat.* 4119; *Wight Ic.* t. 189; *A. DC. Prodr.* viii. 233.

EAST BENGAL; Tipperah, *Roxburgh*; Khasia Mts., *Wallich*.

A large tree; branchlets glabrous. *Leaves* $7\frac{1}{2}$ by 3–$3\frac{1}{2}$ in., base cuneate or obtuse, nerves not prominent; petiole $\frac{1}{3}$ in. *Male fl.* subfasciculate in $\frac{1}{4}$ in. rusty cymes; calyx $\frac{1}{5}$ by $\frac{1}{8}$ in., subtubular, campanulate, lobed nearly halfway down; lobes 5, oblong, subobtuse; corolla $\frac{1}{3}$ in., tubular, lobed less than halfway down, densely villous without; stamens 16, glabrous, anthers linear, connective hardly produced. *Female*

fl.: cymes $\frac{1}{2}$–2 in., often on the old branches; calyx $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{4}$ in.; corolla $\frac{1}{2}$ by $\frac{1}{3}$ in., as of the male, but larger; staminodes 8–12; ovary hairy, 8–12-celled, stigmas 4–6. *Fruit* 2–3 in. diam., globular, nearly glabrous; fruiting calyx $1\frac{1}{2}$ in. across.

56. **D. densiflora,** *Wall. Cat.* 4140; leaves large elliptic or oblong obtuse or scarcely acuminate glabrous, male fl. numerous in somewhat large cymes, calyx 4-lobed nearly to the base lobes with reflexed margins, corolla tubular fulvous-tomentose without, stamens 15–16 glabrous. *A. DC. Prodr.* viii. 233; *Hiern in Trans. Camb. Phil. Soc.* xii. 171; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 134.

MOULMEIN and AMHERST; *Wallich.* ARRACAN, MARTABAN and TENASSERIM; rare, *Kurz.*

Leaves $7\frac{1}{2}$ by $2\frac{1}{2}$–$3\frac{1}{4}$ in., base obtusely cuneate; primary nerves wide apart, much arched, slightly elevated above, reticulated nervation distinct on both surfaces; petiole $\frac{1}{2}$ in. *Male fl.*: cymes 1–2 in. diam., minutely rusty-pubescent; bracts $\frac{1}{5}$ in., ovate; pedicels 0–$\frac{1}{5}$ in.; calyx-lobes $\frac{1}{6}$ by $\frac{1}{8}$ in.; corolla $\frac{1}{2}$ in., narrowly cylindric; anthers and connective glabrous. *Female fl.*: cymes $\frac{2}{3}$–$1\frac{1}{2}$ in., 12–20-flowered; calyx-lobes $\frac{1}{3}$ by $\frac{1}{5}$ in. *Fruit* $\frac{3}{4}$ in. diam., globose, ultimately glabrescent; pedicels in fruit $\frac{1}{4}$–$\frac{1}{3}$ in. *Albumen* ruminated (Hiern), but the affinity of this species seems to be with *D. undulata.*

57. **D. Horsfieldii,** *Hiern in Trans. Camb. Phil. Soc.* xii. 193; leaves large ovate-oblong or elliptic-oblong glabrous strongly reticulate beneath, male fl. in compound cymes, calyx-lobes ovate with reflexed margins, corolla urceolate ferruginous-hispid without, female fl. in large cymes. D. frutescens, *Hassk. Pl. Jav. Rar.* 467, *not of Blume.*

MALACCA; *Griffith* (Kew Distrib. n. 3620).—DISTRIB. Java.

Branchlets soon glabrous. *Leaves* $9\frac{1}{2}$ by $2\frac{3}{4}$–$4\frac{1}{4}$ in., shortly acuminate, base rounded or obtuse, nerves (primary and secondary) impressed above very strongly raised beneath; petiole $\frac{1}{4}$ in. *Male flowers*: cymes about 1 in., few-flowered; calyx $\frac{1}{4}$ in., deeply 4-lobed, fuliginous-hispid; corolla $\frac{1}{2}$ in., urceolate, fuliginous-hispid without, lobes 4 ovate; stamens 14–16, filaments hairy, anthers glabrous. *Female fl.*: cymes 1–4 in.; bracts $\frac{1}{3}$ in., elliptic; calyx nearly as in the male; corolla $\frac{1}{2}$ in., very deeply 4–5-lobed; staminodes 12; ovary 8-celled, cells 1-ovuled. *Fruit* $\frac{2}{3}$ in. diam., globose, fuliginous hairy, ultimately glabrescent; lobes of the fruiting calyx $\frac{1}{3}$ in., margins strongly reflexed, auriculate.

58. **D. paniculata,** *Dalz. in Hook. Kew Journ.* iv. 109; leaves broad-oblong obtusely cuneate at both ends glabrous, male fl. panicled, calyx-lobes foliaceous ovate, corolla tubular black-velvety without, female flowers solitary or few together. *Dalz. & Gibs. Bomb. Fl.* 141; *Bedd. Ic. Pl. Ind. Or.* t. 125, and *For. Man.* 144; *Hiern in Trans. Camb. Phil. Soc.* xii. 190.

DECCAN PENINSULA; in the Ghauts, *Wight*; Concan, *Dalzell*; Canara, *Ritchie*; Anamallays, *Beddome.*

A large tree; nearly glabrous except the flowers. *Leaves* $6\frac{1}{3}$ by 2 in., mature strongly closely reticulate on both surfaces; petiole $\frac{1}{4}$ in. *Male fl.*: cymes 1–$1\frac{1}{2}$ in., sparingly pilose, pedicels 0–$\frac{1}{6}$ in., bracts ovate caducous; calyx 5-lobed nearly to the base, lobes $\frac{1}{5}$–$\frac{1}{3}$ in., pubescent without and within; corolla $\frac{1}{2}$ in. (or rather more) lobed half-way down; stamens 20, glabrous. *Female fl.* solitary or in 2–5-flowered cymes, peduncled; bracts ovate, caducous; ovary 4-celled, cells 1-ovuled. *Fruit* 1 by $\frac{3}{4}$ in., ellipsoid, ferruginous-hirsute; fruit-calyx 5-lobed, enlarged, nearly glabrous; lobes $\frac{1}{2}$–$\frac{2}{3}$ in. long and broad, plicate, auricled.

59. **D. Brandisiana,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 72; leaves lanceolate or oblong acuminate base cuneate or subobtuse sparsely pilose or ultimately nearly glabrous, male fl. in very short cymes, corolla tubular minutely closely pilose, stamens about 16, female fl. in many-flowered cymes. *Hiern in*

Trans. Camb. Phil. Soc. xii. 184; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 138.

UPPER TENASSERIM; *Brandis.*—DISTRIB. Upper Birma.

A tree; branchlets pubescent. *Leaves* 8½ by 2¼ in., or wider (*Kurz*); primary nerves much raised beneath, oblique, secondary conspicuous, undulate; petiole ¼ in. *Male fl.*: cymes 0–½ in., densely fascicled, on the old wood or in the axils of the leaves; calyx ⅛ in., divided more than half-way down, rusty villous; corolla ½ in., narrowly tubular, lobes short obtuse; filaments densely pilose, anthers and connective glabrous. *Female fl.*: cymes 1 in., rusty pubescent; bracts $\frac{1}{20}$ in., lanceolate; pedicels ⅓–½ in.; calyx and corolla nearly as in the male but rather larger; staminodes 5–8; ovary ovoid-conic, hairy, style hairy, stigmas 6–8 glabrous; cells 6–10, 1-ovuled, septa at flowering time complete.

VERY IMPERFECTLY KNOWN SPECIES.

D. CHARTACEA, *Wall. Cat.* 4135, *partly*; glabrous, leaves ovate-lanceolate or narrowly lanceolate acuminate, male fl. sessile in small clusters 4-merous, calyx elongate cylindric lobes ovate ciliate, corolla short lobes obtuse, stamens 16–20 in pairs, anthers hairy. *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 230; *Kurz in Journ. As. Soc.* 1877, pt. ii. 234, and *For. Fl.* ii. 129.—Martaban and Upper Tenasserim; not uncommon, *Kurz.*—DISTRIB. Birma.

Wallich has two sheets of this; the type is a male in very young bud with small narrow leaves; the duplicate sheet is a male with medium large young flowers and broad- almost ovate-lanceolate leaves. It is very doubtful whether the two belong to the same species. Hiern has described the flowers from the duplicate sheet, while he says the leaves are 2–9½ by ½–3 in. elongate lanceolate, which seems intended to cover both sheets of Wallich. Kurz finds Hiern's plant "not uncommon" in British Birma, but says the leaves are 4–5 in. long, ovate-oblong to oblong and oblong-lanceolate; so that his plant can hardly be referred to the species of Wallich's type sheet in which the leaves are uniformly small and narrow, running from 2½ by ½ in. to 3½ by ¾ in.

D. ELEGANS, *Clarke*; leaves oblong acutely caudate fulvous-pilose on the nerves beneath, male cymes small on ¼ in. peduncles, corolla with a few scattered hairs without or glabrate, calyx 3-partite.

KHASIA MTS.; Nunklow, alt. 3500 ft., *Clarke.*

A small tree; branches persistently fulvous-hirsute. *Leaves* 5½ by 1½ in., obtuse at the base; primary nerves oblique; petiole ⅛ in. *Male fl.* (exceedingly young) about 12 short-pedicelled in each cyme; cyme sometimes 1½ in. compound; female unknown.—Supposed allied to *D. microphylla*, but may be a *Maba.*

VAR. *Hookeri*; shrubby, leaves less finely acuminate. D. stricta. *Hiern in Trans. Camb. Phil. Soc.* xii. 201, *partly, not of Roxburgh.*—Chittagong, Seetakoond; *H. f. & T.*—This differs from *D. stricta* in the hirsute branches and peduncled male cymes.

D. GRATA, *Wall. Cat.* 4142; leaves alternate oblong narrowed at both ends obtuse glabrous, female flowers solitary subsessile, ovary fulvous-hispid, fruit globose subglabrous, fruiting calyx 5-fid pentagonal pubescent on both sides. *A. DC. Prodr.* viii. 232; *Hiern in Trans. Camb. Phil. Soc.* xii. 264.—Nipal; *Wallich.*

Hiern thinks Wallich's fragmentary example may be *D. lanceæfolia*, Roxb.

D. ORIXENSIS, *Wight*; *Hiern in Trans. Camb. Phil. Soc.* xii. 264; leaves alternate elliptic shortly obtusely acuminate base obtuse hairy at least on the midrib beneath, fruits solitary axillary subglobose, fruiting calyx deeply 4-fid hairy without.—Courtallum; *Wight.*—This looks like the female of *D. stricta*, Roxb. Why Wight named a Courtallum species *orixensis* does not appear. Hiern says that *D. orixensis* of Klein and Willd. (A. DC. viii. 230) is probably *D. montana*, Roxb., with which also Beddome agrees (For. Man. 143); but the short description of Willd. appears to fit Wight's examples of *D. orixensis* very well.

D. PYRRHOCARPA, *Miq. Fl. Ind. Bat. Suppl.* 250, 583; shoots pubescent soon glabrescent, leaves elliptic-oblong shortly acuminate coriaceous densely reticulated, flowers solitary short-peduncled rufous-tomentose, berries size of a cherry depressed-globose rufous-orange-tomentose. *Hiern in Trans. Camb. Phil. Soc.* xii. 266; *Kurz in Journ. As. Soc.* 1877, pt. ii. 236, and *For. Fl.* ii. 136.—West Sumatra.

VAR. *andamanica*, Kurz; leaves oblong to narrow-oblong, lateral nerves faint and numerous, reticulation more lax.—Andamans; *Kurz*.—Not seen, and for the present exceedingly obscure; for Kurz l. c. adds "the Andaman tree, I have little doubt, is a different species" (i.e. from the Sumatran), "but the material is too incomplete for description."

D. ROYLEI, *Wall. Cat.* 4134; *A. DC. Prodr.* viii. 239.—There is no specimen of this in Wallich's herbarium.

D. VENOSA, *Wall. Cat.* 4126; leaves alternate elliptic shortly acuminate glabrous, female flowers in subsessile clusters 1–3 together, bracts $\frac{1}{8}$ in. ovate. Anonacea?, *Hiern in Trans. Camb. Phil. Soc.* xii. 271.—Penang; *Wallich*.

The single fruiting calyx (not perhaps the normal form) on Wallich's specimen is 3-lobed, but the young fruit in it is globose, undivided, and can hardly be Anonaceous. The specimen might be *D. undulata* or some closely allied species.

ORDER XCI. **STYRACEÆ.** (By C. B. Clarke.)

Trees or shrubs. *Leaves* alternate, exstipulate. *Flowers* hermaphrodite (in the Indian species), in axillary and terminal simple or compound racemes or spikes, sometimes solitary, white, rarely rose; bracts small. *Calyx* campanulate, superior or inferior, limb 5–4-toothed or truncate, persistent. *Petals* 5–4, free or united into a short (rarely long) tube, imbricated (in the Indian species). *Stamens* adnate to the petals, 8–10 or very many; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2–5-celled, or (by the early separation of the septa) 1-celled; style filiform; stigma small or capitate; ovules 1 or few on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, 1-seeded, less often 2–3-seeded. *Seeds* albuminous; embryo straight or curved.—Species 220, in the warmer regions of Asia, Australia and America; not known in Africa.

Stamens many, in several series . . . . 1. SYMPLOCOS.
Stamens 10, in 1 series . . . . 2. STYRAX.

1. **SYMPLOCOS,** *Linn.*

Trees or shrubs; often drying yellow. *Leaves* alternate, toothed or entire. *Racemes* or *spikes* axillary, simple or compound, sometimes reduced to a single flower; bracts usually solitary at the base of each pedicel, caducous; bracteoles 3–1, small, at the base of the flower. *Flowers* white (in *S. rosea*, rose), hermaphrodite (in the Indian species). *Calyx-tube* adnate; lobes 5, small, imbricate. *Petals* (in the Indian species) 5, imbricate, free or obscurely connate, more rarely connate into a tube. *Stamens* numerous, in several series, adnate to the corolla tube, usually throughout its length, and in a few species in a tube beyond it; anthers shortly-oblong, dehiscing longitudinally. *Ovary* inferior (in the Indian species), 3-, rarely 2- or 4-celled; style filiform, stigma small capitate sub-3-lobed; ovules 2, pendulous from the inner angle of each cell. *Drupe* ellipsoid, endocarp usually woody, 1–3-seeded. *Seeds* oblong, straight or less often curved; embryo terete, axile, straight or curved.—DISTRIB. Species 160, in the tropics of Asia, Australia and America.

SUBGENUS I. **Hopea** (Species 1 to 59). *Petals* free or connate only at the very base, spreading; buds subglobose. *Filaments* slender, more or less united to the corolla, not forming a tube distinct from the corolla. *Embryo* straight, or curved.—The curvembyrose species constitute the section *Palura*, not adopted here, the embryo being unknown in many species.

SECT. 1. Racemes or spikes (at least some of them) compound. (See also 12. *S. racemosa* var., and 51. *S. angustata*). Species 1 to 11.

* *Embryo curved (in several not known).*

1. **S. cratægoides,** *Ham. ms.*; *Don Prodr.* 145; leaves broadly elliptic closely sharply serrulate towards the acuminate apex, cyme elongate compound subpanicled, disc glabrous. *A. DC. Prodr.* viii. 258; *Brand. For. Fl.* 299; *Kurz For. Fl.* ii. 147, and *in Journ. As. Soc.* 1877, pt. ii. 239. S. paniculata, *Wall. Cat.* 4429. Lhodra cratægoides, *Dcne in Jacq. Voy. Bot.* 103, t. 110.—*Griff. Itin. Notes* 163, n. 839.

HIMALAYA; alt. 2–8000 ft.; from Kashmir to Bhotan; common. KHASIA; alt. 3–5000 ft.; common. MARTABAN; Nattoung Hills (*Kurz*).—DISTRIB. Japan.

A tree, 40 ft., or shrub. *Leaves* $2\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., varying from lanceolate acuminate to broadly obovate-elliptic subobtuse, teeth sometimes nearly obsolete, usually softly pilose beneath, at least on the midrib, sometimes glabrous; reticulating nerves prominent beneath; petiole $\frac{1}{5}$ in. *Panicles* 1–5 in., hairy, glabrescent or glabrous; lateral branches distinct, cymosely many-flowered, or with few longer-pedicelled flowers; bracts small, linear, caducous. *Calyx-tube* obconic, glabrous, or sparsely pilose or densely hirsute; teeth small obtuse, or lanceolate subacute, glabrous ciliate or pilose. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. *Stamens* 20–60. *Fruit* $\frac{1}{8}$–$\frac{1}{3}$ in., obliquely ovoid or obovoid, calyx-rim small, very much narrower than the fruit.—Most variable: the typical North-west form (described by Brandis) has a glabrous calyx-tube with short obtuse teeth; while Griffith's n. 306 (from Khasia) has densely hairy calyx-tube and long calyx-teeth. The fruits vary so greatly in form and size that Thomson (erroneously) regarded some as insect-injured.

2. **S. spicata,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 541; leaves broadly lanceolate acute serrulate glabrous, flowers sessile in long-branched spikes, disc glabrous. *Wall. Cat.* 4417; *Brand. For. Fl.* 300; *Kurz For. Fl.* ii. 146, and *in Journ. As. Soc.* 1877, pt. ii. 239. S. polycarpa, *Wall. Cat.* 4423; *A. DC. Prodr.* viii. 255; *Kurz ll. c.* S. Loha, *Don Prodr.* 144; *A. DC. l. c.* S. racemosa, *Wall. Cat.* 4418, *in part, not of Roxb.*

NORTH and EAST INDIA; near the base of the hills, alt. 0–4000 ft.; from Kumaon to Bhotan, Assam and Martaban; common.—DISTRIB. China, Japan, Australia?.

A small tree. *Leaves* 5 by 2 in., base cuneate; nerves distant, not prominent beneath, parallel; petiole $\frac{1}{4}$ in. *Spikes* 2–4 in., often tripartite below, sometimes panicled, glabrous or obscurely rusty-pubescent; flowers all closely sessile, the depressed ovary and short calyx-tube embraced by the 3 persistent small ovate obtuse bracteoles. *Calyx-lobes* $\frac{1}{20}$ in., round, glabrous or slightly pubescent. *Petals* $\frac{1}{8}$ in. *Stamens* about 40. *Fruit* $\frac{1}{5}$ in. diam., subsymmetric, ribbed (or smooth), globose, surmounted by a very short cylindric tube; calyx-rim as wide as the tube.—Wallich's *S. polycarpa* only differs in the larger leaves; Kurz separates it by the smooth, not ribbed fruit; but the fruit is distinctly ribbed in Wallich's *polycarpa*. The whole of this series of *S. spicata* type is readily distinguished by the long branches of the spike, with small distant flowers and very depressed ovaries.

VAR. *laurina*, Wall. Cat. 4416 (sp.); spikes shorter fulvous subtomentose or hirsute, flowers rather larger densely crowded, ovary less depressed. S. spicata, *A. DC. Prodr.* viii. 254; *Wight Ill.* t. 150; *Thwaites Enum.* 154; *Bedd. For. Man.* 149. S. flavida *and* S. Loha, *Miq. in Pl. Hohenack.* n. 1053, 1054. Myrtus laurina, *Retz Obs.* iv. 26. Eugenia laurina, *Willd. Sp. Pl.* ii. 967. Bobua laurina, *DC. Prodr.* iii. 24. Hopea spicata, *Dalz. & Gibs. Bomb. Fl.* 140.—W. side of the Deccan Peninsula and Ceylon; alt. 2–7000 ft., very common.—(*Burm. Thes. Zeyl.* t. 62.)

VAR. *attenuata*, Wall. Cat. 4426 (sp.); leaves long-attenuate at the base, spikes shorter tripartite or simple, fruits smaller often only $\frac{1}{8}$ in. *A. DC. Prodr.* viii. 256.—Khasia; alt. 3–6000 ft., common, Hills of British Birma, *Kurz.*

VAR. *malasica*; leaves less coriaceous, secondary nerves prominent, flowers less closely sessile, ovary not depressed, calyx-lobes oblong prominent above the bracteoles.—Malay Peninsula, common; *Maingay*, n. 957, &c.—This is not exactly S. Stawellii, *F. Muell. Fragm. Phyt. Austr.* v. 60, which has the flowers more distinctly pedicelled, and is more like the Ceylon *S. laurina.*

3. **S. oxyphylla,** *Wall. Cat.* 4430; leaves oblong-lanceolate acuminate serrulate glabrous, racemes compound, flowers small mostly pedicelled. *A. DC. Prodr.* viii. 256. S. pedicellata, *Kurz in Journ. As. Soc.* 1873, pt. ii. 89, and *For. Fl.* ii. 147.

KHASIA; *Wallich*; Cherra, alt. 4000 ft., *H. f. & T.* ASSAM; *Masters.* PEGU; rather rare, *Kurz.*

A small tree; branchlets glabrous. *Leaves* 5 by $1\frac{3}{4}$ in., subcaudate, base attenuate; nerves distant, not prominent beneath, parallel; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Panicles* $1\frac{1}{2}$–2 in. diam., many-fld., puberulous, finally glabrous; bracts small, caducous. *Calyx* nearly glabrous; teeth $\frac{1}{20}$ in., round. *Corolla* $\frac{1}{8}$ in. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in., ovoid, narrowed upwards into a cylindric beak, often 3-seeded, scarcely ribbed; fruiting calyx as wide as the beak.—S. xanthophylla, *Jungh. & De Vriese*; *Miq. Fl. Ind. Bat.* i. pt. ii. 468, has pedicelled flowers, but the fruits are small, and it resembles *S. spicata* var. *attenuata* rather than *S. oxyphylla.*

4. **S. fasciculata,** *Zoll. Syst. Verz.* 136; leaves oblong-lanceolate minutely pilose on the midrib beneath or glabrous very short-petioled, cymes compound very small, flowers small mostly pedicelled. *Miq. Fl. Ind. Bat.* i. pt. ii. 467. Dicalyx tinctorius, *Blume Bijd.* 1116.

MALACCA; *Griffith* (Kew Distrib. n. 3665), *Maingay* (n. 958). SINGAPORE; *Murton.*—DISTRIB. Java, Borneo.

A large tree (*Maingay*); branchlets ashy-pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{4}$ in., obtusely acuminate, base obtusely rhomboid, entire or obscurely crenate-serrate; thinly chartaceous, nerves distant, not prominent beneath, parallel; petiole $\frac{1}{8}$ in. *Cymes* scarcely $\frac{2}{3}$ in. diam., ashy-pubescent; bracts minute. *Calyx-teeth* $\frac{1}{20}$ in., ovate-oblong, grey-pubescent. *Corolla* $\frac{1}{3}$ in. *Stamens* 25. *Disc* glabrous; style glabrous (in the Malacca examples), sparsely villous in the Javan. *Fruit* $\frac{1}{3}$ in., obliquely ovoid, narrowed to a cylindric beak; embryo not seen (fruit imperfectly ripe), probably curved.

5. **S. oligandra,** *Bedd. Ic. Pl. Ind. Or.* t. 272; leaves oblong cuneate at both ends subentire glabrous, cymes scarcely $\frac{1}{4}$ in. compound minutely hairy, disc closely shortly hairy.

TRAVANCORE GHATS; *Beddome.*

A tree (*Beddome*); branchlets glabrous. *Leaves* $1\frac{3}{4}$ by $\frac{2}{3}$ in., coriaceous; nerves 9–10 on each side, very slightly impressed; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Cymes* 3–6-fld.; bracts minute, deciduous. *Calyx-tube* $\frac{1}{24}$ in., glabrous; teeth $\frac{1}{24}$ in., closely adpressedly pilose. *Petals* $\frac{1}{10}$ in. *Stamens* 12–14, in pairs. *Ovary* 3-celled. *Fruit* unknown.

6. **S. ferruginea,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 542; leaves broad-lanceolate rusty-villous on the nerves beneath, nerves numerous strong parallel, spikes compound rusty-villous. *Wall. Cat.* 4412; *A. DC. Prodr.* viii. 257. S. mollis, *Wall. Cat.* 4433; *G. Don Gen. Syst.* iv. 3. S. Verhuelli, *Jungh & De Vriese*; *Miq. Fl. Ind. Bat.* i. pt. ii. 467. S. polystachya, *Zoll. & Mor. Verz.* 43, *not of Wall.* S. lachnobotrya *and* Horsfieldiana, *Miq. Fl. Ind. Bat. Suppl.* 475. S. javanica, *Kurz in Journ. As. Soc.* 1877, pt. ii. 239 (syn. *S. rubiginosa* excl.), and *For. Fl.* ii. 145. Dicalyx javanicus, *Blume Bijd.* 1117.

KHASIA; *Wallich*; Mikir Hills, *Simons.* MALAY PENINSULA; from Mergui to Malacca, common.—DISTRIB. Malay Archipelago.

A small tree; branchlets subpersistently rusty-villous. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{4}$ in., acuminate, base cuneate, often broader above the middle, serrulate or subentire, mature villous beneath or glabrescent, coriaceous, shining, smooth with scarcely impressed nerves above; nerves 10–15 on each side, strongly raised beneath, quite parallel, carried $\frac{3}{4}$ (or more) the way to the margin before inarching; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicles* 2–5 in., very compound and villous, branches long; flowers sessile, bracteoles concealing the short calyx-tube. *Calyx-teeth* $\frac{1}{12}$ in., ovate, villous. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. *Stamens* 40. *Ovary* depressed, disc glabrous. *Fruit* $\frac{1}{6}$ in., depressed-globose, ribbed; beak hardly any besides the enlarged glabrescent calyx-teeth.

VAR. *polystachya*, Wall. Cat. 4428 (sp.); leaves beneath glabrous or adpressedly pilose on the midrib only. *A. DC. Prodr.* viii. 254.—Gurwhal, alt. 5500 ft., *Strachey & Winterbottom.* Kumaon; alt. 4,500 ft., *Madden.* Darjeeling; alt. 5,000 ft., *Gamble.* Khasia; alt. 3–4000 ft., *Wallich, Clarke.*—This may be specifically separable, for when the midrib beneath is hairy, the indumentum is widely different from that of *S. ferruginea.* Brandis thinks (*For. Fl.* 300) this species too near *S. spicata*; the nervation of the leaves differs widely.

** *Embryo straight* (in several not known).

7. **S. adenophylla,** *Wall. Cat.* 4427; leaves narrowly lanceolate or broadly elliptic obtusely acuminate subentire glabrous, racemes compound minutely rusty-pubescent, disc glabrous. *A. DC. Prodr.* viii. 257. S. iteophylla, *Miq. Fl. Ind. Bat. Suppl.* 476.

PENANG; *Wallich.* SINGAPORE and MALACCA; *Wallich, Griffith, Maingay.*—DISTRIB. Java, Borneo.

Branchlets glabrous. *Leaves* 3 by $\frac{2}{3}$ in., or $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate or attenuate, coriaceous; nerves distant, not prominent; petiole $\frac{1}{5}$ in. *Racemes* 1–2 in., tripartite, lax; pedicels 0–$\frac{1}{12}$ in.; bracteoles minute, subobsolete. *Calyx-tube* glabrous or minutely rusty; teeth $\frac{1}{20}$ in., oblong. *Corolla-lobes* $\frac{1}{8}$ in. *Stamens* 40. *Fruit* $\frac{1}{3}$ by $\frac{1}{6}$ in., terete, ellipsoid, smooth, tip obtuse; calyx-teeth closely incurved, inconspicuous. —Wallich doubted whether his broad-leaved examples from Singapore (var. *virgata*, Wall.) might not be specifically distinct from his narrow-leaved ones from Penang; but two extreme forms of leaf occur on one branch.

8. **S. celastrifolia,** *Griff. ms.*; leaves elliptic-oblong cuneate at both ends crenate glabrous, racemes laxly panicled minutely rusty-villous, disc glabrous.

MALACCA; *Griffith* (Kew Distrib. n. 3651).—DISTRIB. Borneo.

Branchlets glabrous. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$–$1\frac{3}{4}$ in., very shortly obtusely acuminate, base cuneate or subobtuse, strongly crenate, thickly chartaceous, when dried dull-green above, pale-yellow beneath; nerves not prominent; petiole $\frac{1}{5}$ in. *Racemes* 2–3 in., branches long lax; pedicels $\frac{1}{10}$ in.; bracteoles subobsolete. *Calyx-tube* nearly glabrous, teeth $\frac{1}{10}$ in., elliptic, glabrous. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. *Stamens* 40. *Fruit* more than $\frac{1}{4}$ in., ovoid-ellipsoid, smooth; calyx-rim as wide as the upper part of the fruit, teeth erect. *Embryo* straight.

9. **S. phyllocalyx,** *Clarke*; leaves oblong acuminate serrulate glabrous, spikes very short sparingly compound minutely pilose, calyx-teeth green round, disc glabrous. Symplocos sp. n. 812, *Griff. Itin. Notes,* 158. Symplocos sp. n. 54, *Herb. Ind. Or. H. f. & T.* Symplocos sp. (Chandan), *Gamble Darjeeling List,* 54. Laurinea ? n. 660, *Griff. Itin. Notes,* 141.

SIKKIM; alt. 8–12,000 ft., *J. D. H.*, &c., frequent. BHOTAN; *Griffith.*

A small tree or shrub, almost wholly glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., base cuneate or attenuate, coriaceous, shining; midrib elevated above, broad; nerves numerous, often 14 on each side, slender but distinct above; petiole $\frac{1}{3}$ in. *Spikes* often shorter than the petioles, bracts glabrous when young; bracteoles $\frac{1}{8}$ in., ovate. *Calyx-teeth* $\frac{1}{8}$ in., glabrous or microscopically ciliate on the margins. *Corolla* $\frac{1}{6}$ in. *Stamens* 40–50. *Disc* shortly hairy; style often sparsely hairy. *Fruit* nearly $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, crowned by the unaltered calyx-teeth. *Embryo* straight.—Furnishes a dye exported into Tibet (*Hook. Himal. Journ.* ii. 41).

10. **S. theæfolia,** *Ham. ms.*; *Don Prodr.* 145; leaves oblong acuminate obscurely serrulate glabrous, spikes very short compound minutely pubescent, disc densely hairy. S. lucida, *Wall. Cat.* 4414; *A. DC. Prodr.* viii. 255; *Kurz in Journ. As. Soc.* 1877, pt. ii. 238, and *For. Fl.* ii. 143, *not of Sieb. & Zucc.* S. racemosa, *Wall. Cat.* 4418; *A. DC. l. c., partly*; *Brand. For. Fl.* 300, *not of Roxb.*

HIMALAYA; from Nipal to Bhotan, alt. 5–8000 ft., very common. KHASIA; alt. 4–6000 ft., common. MARTABAN; alt. 5–7000 ft., not unfrequent, *Kurz.*

An erect tree, often 50 ft.; branchlets glabrous. *Leaves* 4¼ by 1⅔ in., base cuneate or obtuse, coriaceous; nerves numerous, indistinct, not parallel; petiole ¼ in. *Panicles* ½–1 in., dense, often tripartite from the base, branches stout; bracts $\frac{1}{10}$ in. broad, obtuse; bracteoles $\frac{1}{16}$ in., broad, obtuse. *Calyx-tube* nearly glabrous, teeth $\frac{1}{16}$ in., broad, obtuse, glabrous, minutely ciliate. *Corolla* ⅛–⅙ in. *Stamens* 20–25. *Disc* densely covered with long white hairs. *Fruit* ⅓ by ⅙ in., ellipsoid, smooth, tip obtuse, calyx-teeth incurved inconspicuous. *Embryo* straight.—There has been much confusion respecting this very distinct species. Wallich has, under No. 4418, three plants named *S. racemosa*, Roxb., none of which are right, except letter C, upon which De Candolle (in whose Herbarium the specimen is) founded his *S. nervosa.*

11. **S. kurgensis,** *Clarke*; leaves oblong acuminate scabrous-villous beneath, panicles rufous-hirsute, flowers subsessile, calyx-tube glabrous, teeth closely silky. Symplocos, n. 31, *Herb. Ind. Or. Hk. f. & T.* S., spicatæ affinis, *Bedd. For. Man.* 152.

Mts. of KURG, common, *G. Thomson*; *Beddome.*

Branchlets thick, soon glabrescent except the tips. *Leaves* 5½ by 2 in., base rounded or subcordate when mature, sub-denticulate, villous and glandular-scabrid beneath, coriaceous; nerves 10 on each side, thick, much elevated beneath; petiole ⅓ in., rusty-villous. *Panicles* 2–3 in.; bracts ¼ in., ovate, densely hairy. *Calyx-lobes* $\frac{1}{10}$ in., ovate. *Petals* ⅙ in. *Stamens* 50. *Disc* and style glabrous. *Fruit* nearly ½ by ¼ in., cylindric, smooth; calyx-rim as broad as the fruit, teeth patent. *Embryo* straight. This differs from *S. Hohenackeri*, n. 37, in the rounded base of the leaves, which are glandular-scabrous beneath, and in the compound spikes.

SECT. 2. Racemes or spikes undivided (in *S. racemosa* var. divided). Embryo straight. Species 12 to 59.

* *Species of the Himalaya and Khasia Mts.*

12. **S. racemosa,** *Roxb. Hort. Beng.* 40, and *Fl. Ind.* ii. 539; leaves oblong cuneate at both ends obscurely crenate, midrib glabrous or pilose beneath, racemes hairy half as long as the leaves, disc glabrous. *Kurz in Journ. As. Soc.* 1877, pt. ii. 238, and *For. Fl.* ii. 144, *not of Wall. nor of A. DC.* S. Hamiltoniana, *Wall. Cat.* 4420; *A. DC. Prodr.* viii. 254; *Brand. For. Fl.* 301. S. rigida, *Wall. Cat.* 4422, *type sheet.* S. nervosa, *A. DC. l. c.* 256, *not of Wight.* S. propinqua, *Hance in Seem. Journ. Bot.* 1868, 329.—Symplocos n. 52, *Herb. Ind. Or. H. f. & T.*

Throughout NORTH-EAST INDIA, alt. 0–2500 ft., common from the Terai of Kumaon to Assam and Pegu; common throughout Chota Nagpore.—DISTRIB. Birma, China.

A small tree, or more frequently a shrub; branchlets soon glabrous. *Leaves* 5 by 1¾ in. (sometimes almost orbicular leaves) obtuse, coriaceous; nerves distant, not conspicuous; petiole ⅓ in. *Racemes* 2–4 in.; bracts ⅙ in., ovate, hairy, deciduous; lower pedicels often distant, $\frac{1}{20}$–¼ in.; bracteoles $\frac{1}{12}$ in., ovate. *Calyx-tube* usually glabrous, lobes $\frac{1}{10}$ in., ovate, minutely pubescent. *Corolla* ⅙ in. *Stamens* sometimes 115. *Fruit* nearly ½ by ¼ in., subcylindric, smooth; calyx-rim nearly as wide as the fruit, with erect teeth. *Embryo* straight.—*S. rigida*, Wall. type, differs by some of the racemes terminating in a leafy branch, so that the pedicels appear solitary from the old wood bearing the fruits.—Kurz must be mistaken in thinking that this was *S. racemosa* of A. DC., who describes his plant as having racemes about as long as the petioles and the ovary pilose at the summit. A. DC.'s plant was therefore, as he states, *S. racemosa*, Wall. = *S. theæfolia*, Don. Kurz also refers the Kew Distrib. n. 3660 to *S. spicata*, whereas that number is *S. racemosa*, Roxb.

VAR. *khasiana*; flowers sessile in dense clusters on the spike. Symplocos, n. 1275, *Griff. Itin. Notes*, 87.—Khasia; Nongkreem (alt. 4500 ft., perhaps), *Griffith.*

VAR. *composita*, Kurz in Journ. As. Soc. 1877, pt. ii. 238; flowers clustered in small cymes subterminal on the elongate branches, stamens about 40. S. rigida, *Wall. Cat.* 4422 *partly*.—Moulmein; *Wallich*. Darjeeling Terai; frequent, *C. B. Clarke*.

13. **S. glomerata,** *King*; *Gamble, Darjeeling List* 54; leaves elongate-lanceolate acuminate gland-serrate glabrous, petioles glandular, flowers and fruits fascicled axillary, disc glabrous. Symplocos, n. 900, *Griff. Itin. Notes*, 177. Symplocos, n. 55, *Herb. Ind. Or. Hk. f. & T.* Incerta, n. 448, *Griff. Itin. Notes*, 125.

SIKKIM and BHOTAN, alt. 1–8000 ft., frequent; *Griffith, J. D. H.*, &c. KHASIA, alt. 2–5500 ft.; *H. f. & T.*, *Simons*.

A shrub; or a tree 10 ft. high (*J. D. H.*); nearly wholly glabrous. *Leaves* 6 by $1\frac{1}{2}$ in., base cuneate, coriaceous; midrib impressed above, nerves distant, conspicuous beneath; petiole $\frac{1}{2}$ in. *Bracts* and *bracteoles* ovate, somewhat woolly, but obscured by the densely fascicled flowers. *Calyx-tube* nearly glabrous; lobes $\frac{1}{20}$ in., broad, rounded. *Corolla* nearly $\frac{1}{6}$ in. *Stamens* 25. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., subcylindric, smooth; calyx-rim nearly as wide as the fruit, teeth erect. *Embryo* straight.

14. **S. ramosissima,** *Wall. Cat.* 4425; leaves oblong lanceolate acuminate membranous serrulate glabrous, racemes numerous scattered few-flowered minutely pubescent longer than the petioles, disc glabrous. *A. DC. Prodr.* viii. 257; *Brand. For. Fl.* 299.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from Gurwhal to Bhotan, common KHASIA; alt. 4000 ft., *H. f. & T.*

A shrub, or tree 30–40 ft; branchlets glabrous. *Leaves* 4 by $1\frac{1}{4}$ in. (occasionally much larger), base cuneate; nerves somewhat distant, slender, distinct beneath; petiole $\frac{1}{4}$ in. *Racemes* $\frac{1}{2}$–1 in., 1–6-flowered, often from lower leafless axils; bracts deciduous; pedicels 0–$\frac{1}{6}$ in.; bracteoles $\frac{1}{16}$ in., ovate, pubescent, adpressed to the calyx-tube. *Calyx-teeth* $\frac{1}{20}$ in., ovate. *Corolla* $\frac{1}{8}$–$\frac{1}{6}$ in. *Stamens* 20. *Fruit* more than $\frac{1}{4}$ in. long, ellipsoid (accompanying subglobose fruits are probably insect-punctured); calyx-rim narrower than the fruits. *Embryo* straight.—In Kew Distrib. n. 3667 (Panukka, in Bhotan, *Griffith*) many of the branches have the racemes reduced to solitary flowers.

15. **S. caudata,** *Wall. Cat.* 4113; leaves lanceolate caudate subentire glabrous, racemes lax hairy much longer than the petioles, calyx-tube obconic glabrous, disc glabrous. *A. DC. Prodr.* viii. 256. S. prunifolia, *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 9; *Miq. in Ann. Mus. Lugd. Bat.* iii. 101. S. Swinhoeana, *Hance in Ann. Sc. Nat. Ser.* 4, xv. 226.

SIKKIM; Darjeeling, *Gamble*. KHASIA (alt. 3000 ft.); *Wallich*, &c. CHITTAGONG; Seetakoond, *H. f. & T.*—DISTRIB. China, Japan.

Attains sometimes 15 ft., usually a shrub. *Leaves* 3 by $\frac{3}{4}$ in., base cuneate, stoutly chartaceous; nerves distinct, distant, not easily separable from the secondary; petiole $\frac{1}{3}$ in. *Racemes* 1–$1\frac{1}{2}$ in., sparingly pilose or fulvous-subhirsute; bracts and bracteoles inconspicuous; pedicels 0–$\frac{1}{6}$ in. *Calyx-tube* $\frac{1}{16}$ in., teeth nearly as long, ovate, subacute. *Corolla* $\frac{1}{8}$ in. *Stamens* 25. *Fruit* (unripe) $\frac{1}{3}$ in., ovoid-cylindric, shining, smooth, crowned by the patent somewhat-enlarged calyx-teeth.—From the form of the unripe fruit, the embryo is presumed to be curved.

16. **S. lancifolia,** *Sieb. & Zucc. Fl. Jap. Fam. Nat.* ii. 9; leaves lanceolate acuminate crenate-serrulate glabrous, spikes slender fulvous-pubescent, disc glabrous. *Miq. in Ann. Mus. Lugd. Bat.* iii. 101. S. leptostachya, *Sieb. & Zucc. l. c.* S. microcarpa, *Bth. in Hook. Kew Journ.* iv. 303.

ASSAM; Patkoye Mts., alt. 2500 ft., *Griffith* (Kew Distrib. n. 3659).—Japan. Hongkong.

A shrub or small tree; branchlets nearly glabrous. *Leaves* $3\frac{1}{4}$ by 1 in., base

cuneate or rhomboid, subcoriaceous; nerves distant, not conspicuous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Spikes* $\frac{1}{2}$–$1\frac{1}{2}$ in., subracemose; flowers small, the minute pedicels and calyx-tube enveloped by persistent fulvous-villous imbricated bracteoles. *Calyx-segments* $\frac{1}{20}$ in., ovate. *Corolla* $\frac{1}{10}$ in. *Stamens* 15–25. *Ovary* 3-celled. *Fruit* $\frac{1}{5}$ in. diam., cuboid-globose; calyx-rim less than one quarter the width of the fruit. *Embryo* curved.—The simple spikes are in one example sometimes changed into dense panicles of abortive flowers with numerous bracteoles.

VAR. *fulvipes*; midrib of the leaves beneath fulvous pilose, spikes villous. S. microcarpa, var.?, *Bth. Fl. Hongk.* 212. Symplocos, n. 657, *Griff. Itin. Notes*. 41. Symplocos, n. 50, *Herb. Ind. Or. Hk. f. & T.*—Khasia; Cherra, *Griffith* (Kew Distrib. n. 3648); Borpani, *H. f. & T.* Assam; *Masters.*

17. **S. Hookeri,** *Clarke*; leaves large obovate-oblong acute minutely toothed glabrous, nerves parallel much elevated beneath, racemes stout minutely rusty. Symplocos, n. 49, *Herb. Ind. Or. Hk. f. & T.*

KHASIA; Nunklow, *H. f. & T.*

Branches thick, glabrous. *Leaves* 12 by $4\frac{1}{3}$ in., base cuneate, thickly chartaceous; midrib and nerves impressed on the upper surface; petiole 1–$1\frac{1}{2}$ in. *Flowers* not seen. *Racemes* (in fruit) from thick branchlets, 2–3 in., simple; pedicels $\frac{1}{4}$ in., distant. *Fruit* $\frac{3}{4}$ by $\frac{1}{3}$ in., elongate ellipsoid, smooth. *Embryo* straight.—From the leaves this appears allied to *S. rubiginosa*, Wall., which has much smaller fruits.

18. **S. macrophylla,** *Wall. Cat.* 4431; leaves large elliptic acute from a rounded base minutely toothed hirsute beneath, spikes 2 in. stout densely rusty-villous.

KHASIA MTS.; *De Silva.*

Branchlet stout, rusty-hirsute. *Leaves* 8 by $3\frac{1}{3}$ in., base obtuse or subcordate, thickly coriaceous, rugose from the deeply impressed nerves; nerves 11 on each side, strongly elevated beneath, secondary distinct; petiole $\frac{3}{4}$ in., densely hirsute. *Bracts* and bracteoles subsimilar, $\frac{1}{5}$ in., ovate, very hairy. *Calyx-tube* $\frac{1}{16}$ in., glabrescent; teeth $\frac{1}{10}$ in., ovate, closely hairy. *Petals* $\frac{1}{5}$ in., elliptic. *Fruit* not seen.

19. **S. dryophila,** *Clarke*; leaves narrowly obovate-lanceolate shortly cuspidate subentire glabrous, racemes long lax sparsely fulvous-hirsute, disc glabrous. Symplocos, n. 53, *Herb. Ind. Or. Hk. f. & T.*

EASTERN NIPAL and SIKKIM, alt. 8–10,000 ft.; in oak forests, *J. D. H.*; Simonbong, alt. 9000 ft., *Gamble.*

A tree (*Gamble*); branchlets glabrous. *Leaves* 6 by $1\frac{3}{4}$ in., base cuneate, densely villous beneath when young, soon glabrous, coriaceous; nerves many, slender, midrib impressed above; petiole $\frac{1}{3}$ in. *Racemes* $3\frac{1}{2}$ in.; bracts caducous, outermost orbicular glabrous, inner oblong villous; pedicels $\frac{1}{8}$–$\frac{1}{5}$ in., bracteoles obsolete. *Calyx-tube* $\frac{1}{12}$ in., nearly glabrous; teeth $\frac{1}{20}$ in., ovate. *Corolla* $\frac{1}{6}$ in. *Fruit* $\frac{1}{5}$ in. diam., subglobose, smooth; calyx-rim much narrower than the fruit. *Embryo* curved.

20. **S. grandiflora,** *Wall. Cat.* 4421; leaves lanceolate subentire glabrous, nerves much elevated beneath, racemes elongate lax nearly glabrous, disc glabrous. *A. DC. Prodr.* viii. 257.

KHASIA MTS.; *De Silva, Griffith.* ASSAM; *Griffith.*

Branchlets glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., base cuneate or subobtuse, thickly chartaceous; midrib impressed, nerves subparallel, secondary distinct beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Racemes* 2–$3\frac{1}{2}$ in.; bracts caducous; pedicels many, 0–$\frac{1}{5}$ in., glabrous or nearly so; bracteoles $\frac{1}{24}$ in., lanceolate, subciliate. *Calyx-tube* $\frac{1}{12}$ in., obconic, glabrous; teeth $\frac{1}{16}$ in., ovate. *Corolla* $\frac{1}{6}$–$\frac{1}{4}$ in. *Stamens* 80. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., subcylindric, smooth; calyx-rim little narrower than the fruit. *Embryo* probably straight.

21. **S. Sumuntia,** *Ham. ms.*; *Don Prodr.* 144; leaves oblong-lanceolate acuminate crenulate glabrous coriaceous, racemes $1\frac{1}{2}$ in. hirsute, calyx-teeth

nearly glabrous, fruit ovoid-cylindric. S. racemosa, *Wall. Cat.* 4418, B *and lower half* A. Symplocos, n. 888, *Griff. Itin. Notes*, 173.

HIMALAYA, alt. 3–7000 ft.; from Nipal to Bhotan, frequent; *Hamilton*, &c. KHASIA; Borpani, *Simons.*

A small tree; branchlets glabrous. *Leaves* 4½ by 1⅓ in., base cuneate; midrib impressed, nerves 11 pairs, sub-parallel, impressed slightly above; petiole ¼ in. *Bracts* and bracteoles villous, caducous; pedicels 0–⅙ in., hirsute. *Calyx-tube* glabrous or nearly so. *Petals* ⅙–⅕ in. *Stamens* 35–40, 5-adelphous. *Disc* glabrous. *Fruit* ⅓ by ⅙ in., smooth, calyx-rim as wide as the upper part of the fruit. *Embryo* straight.—Described from Hamilton's type: the fruit from Sikkim examples of J. D. H.—A narrow-leaved var.? of *S. decora*, Hance (in Trimen Journ. Bot. 1874, 368), from Ningpo, hardly differs but by the slightly longer flowers.

VAR. *floribunda*, Wall. Cat. 4419 (sp.); flowers spiked. i.e. pedicels 0 or most obscure. S. Sumuntia, *A. DC. Prodr.* viii. 255. Symplocinea, n. 739, *Griff. Itin. Notes*. 150.—Nipal to Bhotan, Assam and Khasia.—Hamilton also collected this, and did not suppose it identical with his *S. Sumuntia.*

22. **S. pyrifolia,** *Wall. Cat.* 4415; leaves elliptic-lanceolate acuminate minutely toothed glabrous rigid, racemes 1½ in. glabrous or sparsely hairy, calyx-teeth densely silky, fruit cylindric-ellipsoid. *A. DC. Prodr.* viii. 256.

NIPAL; *Wallich.* SIKKIM; alt. 7000 ft., *J. D. H.* BHOTAN; *Griffith.* KHASIA; alt. 2–5000 ft., very common.

Closely resembling *S. Sumuntia*: the leaves are stiff and crisp rather than coriaceous, the petioles rather longer. Hamilton named this *S. salicifolia* or Lodh of the Bengalees, considering it a var. of *S. racemosa*, Roxb. Don hence took the specific name *S. Loha*, his description of which refers to *S. spicata.*

** *Species of the Malay Peninsula* (see also 12. *S. racemosa*).

23. **S. ophirensis,** *Clarke*; leaves elliptic-cuneate obtuse subentire glabrous, petiole very short, racemes very short closely silky. Symplocos, 42, *Herb. Ind. Or. H. f. & T.*

MALACCA; Mt. Ophir summit, *Griffith* (Kew Distrib. n. 3650), *Lobb.*

Branches glabrous. *Leaves* 3½ by 1⅓ in., base cuneate, stiffly chartaceous; nerves distant, reticulations close, prominent beneath; petiole $\frac{1}{10}$–⅙ in. *Racemes* ⅓ in., dense; bracts and bracteoles inconspicuous; pedicels 0–$\frac{1}{12}$ in. *Calyx-tube* $\frac{1}{16}$ in., closely fulvous-silky, teeth $\frac{1}{20}$ in., ovate, fulvous-pilose. *Petals* ⅛ in. *Stamens* 40. *Disc* nearly glabrous. *Fruit* ⅓ by ⅕ in., ovoid-cylindric, smooth; calyx-rim as wide as the upper part of the fruit. *Embryo* straight.

24. **S. leucantha,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 89, and *For. Fl.* ii. 148; leaves oblong or ovate acute crenate glabrous, racemes hardly 1 in. hirsute, calyx nearly glabrous, teeth prominent.

PEGU; Irrawaddi swamp-forests, *Kurz*; Moulmein, *Parish.*

A tree 20–25 ft. (*Kurz*); branchlets glabrous. *Leaves* 3½ by 1½ in. (in Kurz's examples), much wider in those of Parish, base cuneate or obtuse, thinly chartaceous with slender conspicuous nerves; primary nerves distant, only 1 or 2 pairs from the upper half of the midrib. *Pedicels* 0–⅛ in., hairy; bracteoles ⅛ in., elliptic, hairy, deciduous. *Calyx-tube* $\frac{1}{16}$ in., teeth $\frac{1}{12}$ in., ovate, nearly glabrous. *Corolla* ⅛ in. *Stamens* 40. *Disc* glabrous. *Fruit* unknown.

25. **S. sulcata,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 65, and *For. Fl.* ii. 145; leaves oblong acuminate subentire coriaceous glabrous, racemes 1 in. rusty-tomentose, fruit ellipsoid longitudinally furrowed.

MARTABAN and UPPER TENASSERIM, alt. 3–6000 ft.; in the drier hill-forests, frequent, *Kurz.* MOULMEIN; *Lobb.*

A tree 20–25 ft. (*Kurz*); branches glabrous. *Leaves* 4½ by 1⅓ in., base cuneate or

rhomboid, often unequal sided; midrib and nerves strongly raised beneath, nerves 13 pairs sub-parallel; petiole $\frac{1}{4}$ in. *Pedicels* 0–$\frac{1}{12}$ in.; bracts and bracteoles subsimilar, $\frac{1}{12}$ in., obovate-oblong, pubescent. *Calyx-tube* nearly glabrous; lobes $\frac{1}{12}$ in., ovate-lanceolate, subobtuse, pubescent. *Petals* $\frac{1}{6}$ in. *Stamens* numerous. *Fruit* $\frac{1}{3}$ by $\frac{1}{6}$ in., rusty, calyx-rim much narrower than the fruit, teeth accrescent. *Embryo* straight.

26. **S. leiostachya,** *Kurz in Journ. As. Soc.* 1873, pt. ii. 89; leaves oblong acuminate serrulate fulvous-pilose on the midrib and primary nerves beneath, racemes numerous 2–4 in. very narrow nearly glabrous many-flowered. S. leiostachya, *Kurz in Journ. As. Soc.* 1877, pt. ii. 239, and *For. Fl.* ii. 144 (*as to flowers only*).

TENASSERIM; *Helfer* (Kew Distrib. n. 3656).

A large tree (*Helfer*). *Leaves* 4$\frac{1}{4}$ by 1 in., base obtuse or rounded, coriaceous; midrib and nerves impressed above, prominent beneath; petiole $\frac{1}{5}$ in. *Racemes* axillary, and 10–15 crowded at the ends of the branchlets, 20–40-flowered, when young densely spicate; pedicels later sometimes attaining $\frac{1}{8}$ in.; bracteoles $\frac{1}{12}$ in., ovate, glabrous. *Calyx-tube* $\frac{1}{24}$ in., teeth $\frac{1}{16}$ in., ovate, glabrous. *Petals* $\frac{1}{8}$ in. *Stamens* 40, small. *Fruit* not known.—Kurz mistook the fruit of a Nicobar Symplocos (*S. Nicobarica*) for that of this species.

27. **S. nicobarica,** *Clarke*; leaves broadly oblong shortly acuminate serrulate coriaceous nearly glabrous, fruiting racemes 2–3 in. nearly glabrous, fruits ovoid-conic. S. leiostachya, *Kurz For. Fl.* ii. 144, *partly*.

NICOBARS; Kamorta, *Kurz*.

Young branchlets fulvous-hirsute. *Leaves* 5 by 1$\frac{3}{4}$ in., base rhomboid, obscurely fulvous-pilose on the midrib beneath; nerves prominently raised beneath, not quite parallel; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Racemes* stout; lower pedicels $\frac{1}{5}$ in. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., smooth; calyx-rim as wide as the upper part of the fruit, teeth erect. *Embryo* straight.—Flowers not known. From the fruit this appears to be allied to *S. racemosa*, Roxb.

28. **S. cerasifolia,** *Wall. Cat.* 4434; leaves oblong acute at both ends crenate pilose on the midrib beneath, spikes 1$\frac{1}{2}$ in. villous, calyx-teeth large, fruit ellipsoid large. *A. DC. Prodr.* viii. 257.

PENANG; *Wallich.* MALACCA; *Maingay* (Kew Distrib. n. 962).

Branchlets glabrescent. *Leaves* 5$\frac{1}{2}$ by 1$\frac{1}{2}$ in., coriaceous; nerves very oblique, distant, obscure above, elevated beneath; petiole $\frac{1}{3}$ in. *Spikes* solitary, axillary and crowded, subterminal; bracts $\frac{1}{4}$ in., ovate, very hairy; pedicels 0; bracteoles caducous. *Calyx-tube* $\frac{1}{16}$ in., subglabrous; teeth $\frac{1}{10}$ in., ovate, subacute, pilose. *Petals* $\frac{1}{8}$ in. *Stamens* 30. *Disc* and lower part of style with a few hairs. *Fruit* 1 by $\frac{1}{2}$ in., smooth; calyx-rim $\frac{1}{5}$ in. broad. *Embryo* straight.

29. **S. rubiginosa,** *Wall. Cat.* 4432; leaves large obovate-oblong acute, nerves parallel much raised beneath, spikes 2 in. silky-villous, fruit ellipsoid small. *A. DC. Prodr.* viii. 257.

PENANG; *Wallich.* MALAY PENINSULA; *Griffith* (Kew Distrib. n. 3652). MALACCA; *Maingay* (Kew Distrib. n. 955).

Branchlets rusty-hirsute. *Leaves* 10$\frac{1}{2}$ by 4$\frac{1}{4}$ in., cuneate at the base, minutely toothed, rubiginous-villous on the nerves beneath or ultimately glabrous, coriaceous; secondary nerves transverse, subparallel, not strongly reticulated; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Spikes* axillary, subremote; bracts and bracteoles subsimilar, $\frac{1}{6}$–$\frac{1}{4}$ in., ovate, densely villous. *Calyx* sessile, closely silky-villous, tube $\frac{1}{16}$ in.; lobes $\frac{1}{16}$ in., elliptic, subacute. *Petals* $\frac{1}{8}$–$\frac{1}{6}$ in. *Stamens* 30. *Disc* and style glabrous. *Fruit* $\frac{1}{3}$ by $\frac{1}{4}$ in., smooth; calyx-rim $\frac{1}{8}$ in. wide, teeth erect. *Embryo* straight.

30. **S. crassipes,** *Clarke*; leaves large elliptic-lanceolate subentire glabrous short-petioled, racemes $\frac{1}{2}$ in. rusty-villous.

MALACCA; Mount Ophir, *Maingay* (Kew Distrib. n. 960).

Branchlet glabrous. *Leaves* $6\frac{1}{2}$ by 3 in., base rounded subcordate or obtusely rhomboid, stoutly chartaceous; nerves distinct, distant. irregular, not at all parallel; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., very thick. *Raceme* 4-flowered, axillary; pedicels hardly $\frac{1}{12}$ in.; bracteoles 3, $\frac{1}{10}$ in., ovate, rufous-villous. *Calyx* rufous-villous, tube $\frac{1}{16}$ in.; teeth $\frac{1}{12}$ in., ovate. *Petals* $\frac{1}{8}$ in. *Stamens* 30. *Ovary* 3-celled; disc minutely fulvous-pilose. *Fruit* unknown.

31. **S. rigida,** *Clarke* (*not of Wall.*); leaves large lanceolate narrowed at both ends subentire coriaceous glabrous, spikes 2 in. pubescent. Doxomma rigidum, *Miers in Trans. Linn. Soc. ser.* ii. *Bot.* i. 104. Barringtonia rigida, *Clarke in Hook. f. Fl. Brit Ind.* ii. 510.

MALACCA; *Maingay* (Kew Distrib. n. 767, 965).

A large tree (*Maingay*); branchlets glabrous. *Leaves* 12 by $3\frac{1}{2}$ in., early glabrate; nerves 13 pairs, much elevated beneath, subparallel; petiole 1–$1\frac{1}{3}$ in. *Spikes* approximated among the penultimate leaves of the branch, erect, ultimately thick rigid; bracts and bracteoles similar, $\frac{1}{4}$ in., ovate, densely grey hairy without. *Calyx-tube* $\frac{1}{16}$ in., glabrescent; teeth $\frac{1}{10}$ in., ovate, densely grey hairy. *Petals* $\frac{1}{6}$ in. *Stamens* 60. *Disc* glabrous. *Fruit* (imperfectly ripe) nearly 1 by $\frac{1}{3}$ in., oblong-ellipsoid; calyx-rim $\frac{1}{6}$ in. wide, teeth erect.—There may still be a doubt whether *Doxomma rigidum* (Maingay, n. 767) is the fruiting state of *Symplocos* sp. (Maingay, n. 965) in good flower; the petioles are longer, the fruiting spike extraordinarily thickened; but it is the fruit either of Maingay, n. 965, or some closely allied species.

*** *Species of the Deccan Peninsula* (see also 12. *S. racemosa*).

32. **S. monantha,** *Wight Ic.* t. 1236; leaves lanceolate acute or acuminate at both ends glabrous, flowers solitary axillary sessile or very shortly pedicelled. *Bedd. For. Man.* 150.

SHEVAGHERRY HILLS; *Wight.* TINNEVELLY MTS.; *Beddome.*

A leafy, very ramous shrub (*Wight*); branchlets soon glabrate. *Leaves* $1\frac{3}{4}$ by $\frac{2}{3}$ in., base cuneate or subobtuse, subentire or minutely toothed, nerves inconspicuous; petiole $\frac{1}{6}$ in. *Peduncles* 0–$\frac{1}{16}$ in.; bracteoles small, sometimes numerous. *Calyx-tube* $\frac{1}{20}$ in., minutely tomentose, teeth $\frac{1}{20}$ in., elliptic. *Petals* $\frac{1}{8}$ in., or more. *Stamens* 40. *Disc* minutely hairy. *Fruit* not seen.

33. **S. anamallayana,** *Bedd. Ic. Pl. Ind. Or.* t. 116, and *For. Man.* 150; leaves broadly elliptic subobtuse glabrous, flowers solitary peduncled. S. uniflora, *Bedd. in Trans. Linn. Soc.* xxv. 219, *not of Benth.*

ANAMALLAYS, alt. 5–6000 ft.; *Beddome.*

A small tree (*Beddome*); glabrous or the margins of the calyx-lobes minutely pubescent. *Leaves* $1\frac{3}{4}$ by 1 in., base obtuse or rounded, serrulate, rigidly chartaceous; nerves distant, secondary distinctly reticulated; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in., slender, solitary (or, ex Beddome, sometimes 2–3 together) in axils; bracts 0; bracteoles $\frac{1}{8}$ in., lanceolate, caducous, at the base of the calyx-tube. *Calyx-tube* $\frac{1}{16}$ in.; teeth $\frac{1}{24}$ in., triangular. *Petals* $\frac{1}{6}$ in. *Stamens* 40. *Disc* glabrous. *Fruit* not seen.

34. **S. microphylla,** *Wight Ic.* t. 1232; leaves elliptic obtuse or scarcely acute serrulate almost glabrous, spikes very short dense fulvous-villous, disc and style pilose. *Bedd. For. Man.* 150.

NILGHERRIES; *Gardner*; Avalanche, *Wight.*

A ramous bush, 6 ft. high (*Wight*); branchlets rufous-villous. *Leaves* attaining $2\frac{1}{2}$ by $1\frac{1}{3}$ in. (in Wight's examples), obtuse at the base, rigidly coriaceous, adpressedly fulvous pilose on the midrib beneath or glabrate; primary nerves 8 pairs, strong, reticulations distinct; petiole $\frac{1}{4}$ in. *Spikes* $\frac{1}{4}$–$\frac{3}{4}$ in.; bracts $\frac{1}{4}$ in., ovate, fulvous-villous. *Calyx* nearly glabrous, tube $\frac{1}{16}$ in., lobes $\frac{1}{12}$ in., ovate. *Petals* $\frac{1}{6}$–$\frac{1}{5}$ in. *Stamens* 50. *Style* sparsely fulvous-pilose; disc shortly closely pilose. *Fruit* not known.

35. **S. macrocarpa,** *Wight ms.*; leaves oblong narrowed at both ends glabrous, spikes short dense rusty-pubescent, calyx-tube pubescent, fruit large long-ellipsoid.

SOUTH DECCAN PENINSULA; Courtallum, *Wight, herb*, nn. 467, 469.

Branchlets stout, rusty. *Leaves* attaining 8 by $2\frac{1}{2}$ in., slightly crenulate, chartaceous; primary nerves 9 pairs, conspicuous but not thick, secondary nerves distinct beneath; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Spikes* $\frac{1}{2}$–$1\frac{1}{2}$ in., stout; bracts $\frac{1}{4}$ in., spathulate obovate, rusty-pubescent; flowers crowded. *Calyx-tube* $\frac{1}{10}$ in., teeth more than $\frac{1}{8}$ in., lanceolate. *Petals* $\frac{1}{6}$ in. *Stamens* 40. *Disc* and style glabrous or nearly so. *Fruit* $1\frac{1}{4}$ by $\frac{2}{3}$ in., smooth, round; calyx-rim $\frac{1}{8}$ in., broad, teeth patent.—Examples in young fruit may be distinguished from *S. Beddomei* by the short stout spikes, and the shorter petioles.

36. **S. Gardneriana,** *Wight Ic.* t. 1231; leaves elliptic cuneate at both ends villous beneath, nerves numerous strong subparallel, calyx-tube densely hairy, fruits hairy. *Bedd. Fl. Sylv.* t. 237.

SOUTH MALABAR MTS., alt. 4–7500 ft.; Nilgherries, Travancore, Anamallays, &c., frequent.

A small tree; branchlets thick, villous. *Leaves* $4\frac{1}{2}$ by 2 in., slightly crenulate, coriaceous; nerves 10 pairs; petiole $\frac{1}{2}$ in., stout, rusty-villous. *Spikes* 2 in., stout, fulvous-villous; bracts $\frac{1}{4}$–$\frac{1}{5}$ in., ovate, densely villous, caducous; flowers sessile or the lower pedicels attaining $\frac{1}{8}$ in. *Calyx-tube* $\frac{1}{12}$ in., teeth $\frac{1}{8}$ in., oblong, densely silky. *Petals* $\frac{1}{6}$–$\frac{1}{5}$ in., round. *Stamens* 50. *Disc* shortly densely villous. *Fruit* $\frac{1}{3}$–$\frac{1}{6}$ in., cylindric, densely villous; calyx-rim $\frac{1}{6}$ in. wide, teeth patent.—Easily distinguished by the very hairy fruit. Beddome's figure represents the fruit of *Gardneriana*, but the leaves of a plant since sent to Kew as a new species. This latter has leaves more rounded at the base and more acute bracts than *S. Gardneriana.*

37. **S. Hohenackeri,** *Clarke*; leaves elliptic cuneate at both ends villous beneath, nerves numerous strong subparallel, calyx-tube glabrous. Eriobotryæ vel Photiniæ affinis, *Miq. in Pl. Hohenack.* n. 456.

Mercara in CANARA, *Hohenacker.*

Hohenacker's example (in flower) resembles *S. Gardneriana* in every point but the conspicuously glabrous calyx-tube, the calyx-teeth being densely silky. It has hence been supposed a simple-spiked var. of *S. kurgensis*, n. 11; but it so closely resembles *S. Gardneriana* that further material may show it a mere variety thereof.

38. **S. Beddomei,** *Clarke*; leaves elliptic or oblong narrowed at both ends gland-serrulate glabrous, spikes long fulvous-villous, calyx-tube glabrous teeth sparsely pilose, fruit ovoid. S. reticulata, *Grah. Cat. Bomb. Pl.* 104. Symplocos sp., *Herb. Wight*, n. 62. Hopea racemosa, *Dalz. & Gibs. Bomb. Fl.* 140.

WESTERN GHATS; from the Concan to Kurg, frequent.

Perhaps only a variety of *S. racemosa*; but the leaves are less coriaceous, the nerves more numerous (9 pairs), more distinct, the crenatures stronger, the inflorescence spicate, scarcely racemose; but the greatest difference is in the fruit, which is ovoid, $\frac{1}{3}$ by $\frac{1}{5}$ in. (that of *S. racemosa* is much narrower, not wider towards the base).

VAR. *glabrata*; flowering spikes nearly glabrous, fruit subcylindric. Symplocos, n. 32, *Herb. Ind. Or. Hk. f. & T.*—Kurg; *G. Thomson.*—Leaves glabrous from the bud; calyx-teeth glabrous; lower pedicels in fruit attaining $\frac{1}{6}$ in.; fruits $\frac{1}{3}$–$\frac{1}{4}$ by $\frac{1}{5}$ in.

VAR. *flagellaris*; spikes in young fruit $5\frac{1}{2}$ in. long slender wavy, otherwise as var. *glabrata.*—Bombay Presidency; *Dalzell.*

39. **S. foliosa,** *Wight Ic.* t. 1234; leaves elliptic or oblong serrulate from the base glabrous, spikes fulvous-villous, calyx-tube glabrous. S. nervosa, *Wight Ic.* t. 1235; *Bedd. For. Man.* 149, *not of A. DC.*

NILGHERRIES, alt. 5–7500 ft.; *Wight, Gardner, Hohenacker*; common about Ootacamund, *Beddome.*

A large tree (*Beddome*); branchlets soon glabrate. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{4}$–$1\frac{1}{2}$ in., acuminate or shortly acute, base cuneate or obtuse; serratures regular, close; nerves 9 pairs, prominent beneath; petiole $\frac{1}{4}$ in. *Spikes* 1–$1\frac{1}{2}$ in.; bracts caducous. *Calyx-tube* $\frac{1}{12}$ in., teeth $\frac{1}{10}$ in., oblong, glabrous or sparsely pilose. *Petals* $\frac{1}{6}$ in. *Stamens* 40. *Disc* and style glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., broadly cylindric, smooth; calyx-rim scarcely $\frac{1}{8}$ in. wide.—Distinguished from all other Indian species by the leaves being serrulate from the very base. The examples marked by Wight *S. nervosa* are identical with those marked by him *S. foliosa*, as Beddome divined; but Wight's *S. nervosa* is not DeCandolle's (as Beddome presumed), and the name *S. nervosa* has been so misapplied that the undisputed one of *S. foliosa* is adopted here for this well-marked species.

40. **S. rosea,** *Bedd. in Trans. Linn. Soc.* xxv. 219; leaves elliptic-oblong sharply acuminate serrate glabrous, racemes 1–3 in. very hairy as is the calyx, flowers rose-coloured, fruit puberulous. *Bedd. Ic. Pl. Ind. Or.* t. 115, and *For. Man.* 150.

ANAMALLAYS, alt. 2–4000 ft., *Beddome.*

A large shrub; young branches petioles and inflorescence hairy. *Leaves* 5–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; petiole $\frac{1}{3}$ in. *Bracts* deciduous. *Calyx-lobes* acute, half as long as the corolla. *Fruit* $\frac{1}{2}$ in., oblong.—Description copied from Beddome.

VAR. *glabrior*; calyx-tube glabrous, fruit glabrous. S. racemosa, *Herb. Wight, not of Roxb.*—Courtallum and Cochin; *Wight.*—*Leaves* obovate-lanceolate, chartaceous; nerves 6–7 pairs, slender, distinct, not parallel. *Pedicels* (in fruit) $\frac{1}{8}$ in. *Calyx-rim* (in fruit) nearly $\frac{1}{6}$ in., wide (as wide as the summit of the fruit). Wight's examples fit Beddome's picture so well, that this is probably not even a variety.

41. **S. acuminata,** *Bedd. Ic. Pl. Ind. Or.* t. 117, and *For. Man.* 150; leaves obovate-lanceolate acuminate glabrous, racemes slender few-flowered slightly hairy, calyx glabrous, flowers $\frac{1}{2}$ in. diam.

MALABAR; Wynaad, very common on the Brumagherries, alt. 5000 ft., and on the Tirrioot Peak, *Beddome.*

A small tree, or large shrub; young shoots, peduncles and bracts minutely hairy, otherwise quite glabrous. *Leaves* 4 by $1\frac{1}{2}$–$1\frac{3}{4}$ in., base attenuated, subentire. *Racemes* 1–2 in.; pedicels 0–$\frac{1}{10}$ in. *Calyx-lobes* rounded or subacute, half as long as the corolla.—Not seen; description taken from Beddome.

42. **S. pulchra,** *Wight Ic.* t. 1230 (*not good*); leaves oblong acuminate brown-hirsute on both surfaces, racemes 1–2 in., flowers 1–4 large. *Bedd. For. Man.* 149.

NILGHERRIES; Sispara Ghat, alt. 3–4000 ft., *Gardner, Wight, Beddome.*

A shrub; branches densely fulvous-hirsute. *Leaves* $4\frac{1}{2}$ by $1\frac{2}{3}$ in., base rounded, denticulate, chartaceous; nerves 7 pairs, distinct, very oblique; petiole $\frac{1}{12}$–$\frac{1}{4}$ in. *Peduncles* patently rufous-hirsute; pedicels 0–$\frac{1}{8}$ in.; bracteoles $\frac{1}{8}$–$\frac{1}{5}$ in., linear, hirsute. *Calyx-tube* $\frac{1}{10}$ in., sparsely pilose; teeth $\frac{1}{16}$ in., ovate, glabrescent. *Petals* $\frac{1}{4}$–$\frac{1}{3}$ in., elliptic. *Stamens* 50–60. *Disc* densely pilose.—Wight's figure omits the thick, long, spreading brown hairs of the branches, leaves, and peduncles; it is hence very likely to mislead.

43. **S. obtusa,** *Wall. Cat.* 4424; glabrous, leaves obovate-elliptic obtuse subentire coriaceous, spikes 1–4 in., flowers large. *A. DC. Prodr.* viii. 255; *Wight Ic.* t. 1233, and *Ill.* t. 151 b.; *Thwaites Enum.* 185; *Bedd. For. Man.* 149.

SOUTH MALABAR; Nilgherries and Anamallays, alt. 5–8000 ft., common. CEYLON; alt. 5–8000 ft., frequent.

A tree. *Leaves* $1\frac{1}{2}$ by $\frac{3}{4}$ in., or larger (attaining 7 by $3\frac{1}{2}$ in. in some Ceylon varieties),

base attenuated, margin often reflexed; nerves distant, irregular, distinct beneath; petiole long, often $\frac{1}{3}$ in. in the small-leaved varieties. *Bracts* caducous; pedicels 0, or (rarely) $\frac{1}{10}$ in. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{12}$ in., round, prominent. *Petals* $\frac{1}{5}$ in. *Stamens* 50–60. *Disc* glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid-cylindric, smooth; calyx-rim $\frac{1}{5}$ in., broad, teeth prominent.—The varieties enumerated by Thwaites do not differ much from the type, but vary greatly as to the size of the leaves.

**** *Species of Ceylon* (see also n. 43. *S. obtusa*).

44. **S. læta,** *Thwaites Enum.* 184; glabrous, leaves elliptic-lanceolate acute at both ends, spikes 1–2½ in. *Bedd. For. Man.* 151.

CEYLON; elevated parts of the Central Province, *Thwaites.*

A tree. *Leaves* 2 by $\frac{3}{4}$ in., minutely toothed. *Spikes* often peduncled; bracts small, caducous; bracteoles 0; lower pedicels 0, rarely 0–$\frac{1}{10}$ in. *Calyx-lobes* $\frac{1}{16}$ in., round. *Petals* $\frac{1}{6}$–$\frac{1}{5}$ in. *Stamens* 30. *Fruit* more than $\frac{1}{4}$ in., ellipsoid.—Otherwise resembling *S. obtusa*, from which it differs in its acute leaves and smaller flowers.

VAR. *pedicellata*; pedicels longer, attaining sometimes $\frac{1}{3}$ in. Ceylon; *Thwaites*, n. 165.

45. **S. bractealis,** *Thwaites Enum.* 185; glabrous, leaves elliptic-oblong scarcely acute, spikes 1–2 in., bracts ovate glabrous ciliate, bracteoles large persistent. *Bedd. For. Man.* 151.

CEYLON; elevated parts of the Central Province, *Walker, Thwaites.*

A tree. *Leaves* 2 by 1 in., base obtuse or subacute, closely minutely serrulate, coriaceous; nerves 6 pairs, prominent beneath, secondary distinct; petiole $\frac{1}{5}$ in. Rhachis of the *spike* glabrous or sparingly fulvous-pilose. *Bracts* $\frac{1}{4}$ in. and upwards; bracteoles $\frac{1}{6}$ in., sometimes persistent under the ripe fruit. *Calyx-tube* $\frac{1}{16}$ in., lobes $\frac{1}{12}$ in., round. *Petals* $\frac{1}{5}$ in., obovate. *Stamens* 60. *Disc* glabrous. *Fruit* $\frac{1}{3}$ by $\frac{1}{5}$ in., ellipsoid, narrowed at both ends.

VAR. *revoluta*, Wight & Gardner; leaves exceedingly coriaceous, margins revolute. —Ceylon.

46. **S. versicolor,** *Clarke*; glabrous, leaves oblong acuminate at both ends subentire chartaceous, spikes 1–2 in., bracts and bracteoles small glabrous ciliate. S. rufescens, *Thwaites Enum.* 184; *Bedd. For. Man.* 150, *not of H. B. K.*

CEYLON; Ambagamowa District, *Thwaites.*

Branchlets when young glabrous; reddish when dried. *Leaves* 4 by 1$\frac{1}{3}$ in., drying with red blotches; nerves distant, indistinct; petiole $\frac{1}{5}$ in. *Spikes* glabrous; bracts $\frac{1}{8}$ in., ovate, deciduous; bracteoles $\frac{1}{16}$ in., oblong, more ciliate, subpersistent. *Calyx-tube* $\frac{1}{16}$ in., glabrous, teeth $\frac{1}{16}$ in., scarcely ciliate on the margin. *Petals* $\frac{1}{6}$ in. *Fruit* unknown. Probably allied to the two preceding rather than to *S. spicata* as Thwaites supposed.

47. **S. acuta,** *Thwaites Enum.* 186; leaves elliptic-lanceolate acuminate subentire glabrescent except the nerves beneath, racemes small villous, calyx glabrous with rounded lobes. *Bedd. For. Man.* 151.

CEYLON; Saffragam District, alt. 2000 ft., *Thwaites* (C.P. 2681, *partly*).

A tree; young branches fulvous-villous at the tips. *Leaves* 3½ by 1½ in., base cuneate or subobtuse, adpressedly fulvous-pilose on the nerves beneath, coriaceous; nerves 8 pairs, obscure above, strongly raised beneath; petiole $\frac{1}{5}$ in. *Racemes* $\frac{1}{4}$–1 in.; bracts $\frac{1}{6}$ in., ovate, fulvous-pilose, deciduous; pedicels $\frac{1}{10}$ in.; bracteoles $\frac{1}{12}$ in., lanceolate, ciliate. *Calyx-tube* $\frac{1}{24}$ in., teeth $\frac{1}{10}$ in., scarcely pubescent on the margins. *Petals* $\frac{1}{6}$ in. *Fruit* unknown; that described by Thwaites belongs to *S. cuneata* (mixed with C.P. 2681).

48. **S. cuneata,** *Thwaites Enum.* 186; leaves elongate-lanceolate at-

tenuate at both ends subentire glabrous except the nerves beneath, racemes small villous, calyx densely silky with oblong lobes.

CEYLON; *Moon*; Pasdoon Corle at no great elevation, *Thwaites* (C.P. 2920 *and part* 2681).

A tree; branchlets fulvous-villous. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{4}$ in., adpressedly fulvous-pilose on the nerves beneath, coriaceous; nerves 8 pairs, obscure above, strongly raised beneath; petiole $\frac{1}{4}$ in. *Racemes* 1 in.; bracts $\frac{1}{5}$ in., ovate, deciduous; pedicels $\frac{1}{12}$ in.; bracteoles $\frac{1}{12}$ in., ovate. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{8}$ in. *Corolla* not seen. *Disc* and style glabrous. *Fruit* $\frac{1}{2}$ by $\frac{1}{6}$ in., long-cylindric, softly villous; calyx-rim as wide as the upper part of the fruit; teeth enlarged, $\frac{1}{8}$–$\frac{1}{6}$ in. long, lanceolate.

49. **S. hispidula,** *Thwaites Enum.* 186; leaves oblong-elliptic acuminate hispid beneath, racemes 1–4 in., bracts ovate hispid, calyx-tube and fruit softly hairy. *Bedd. For. Man.* 151. S. subcordata, *Wight ms.*

CEYLON; alt. 3–5000 ft., *Wight, Walker, Thwaites.*

A tree; branchlets with patent, fulvous, bristly hairs. *Leaves* $3\frac{1}{2}$ by 2 in., from cuneate-oblong acuminate to cordate-orbicular shortly acute, obscurely crenate, fulvous-hirsute or glabrate above, patently hispid at least on the nerves beneath; nerves 7 pairs; petiole $\frac{1}{10}$–$\frac{1}{4}$ in., usually short. *Racemes* lax, irregular; bracts $\frac{1}{5}$ in., hispid; pedicels 0–$\frac{1}{8}$ (rarely $\frac{1}{4}$) in.; bracteoles $\frac{1}{8}$ in., subacute, hispid. *Calyx-tube* $\frac{1}{10}$ in., lobes $\frac{1}{10}$ in., ovate, obtuse, glabrescent upwards. *Petals* $\frac{1}{5}$ in., round. *Stamens* 50. *Disc* hairy. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{6}$ in., cylindric; calyx-rim as wide as the fruit, teeth enlarged, lanceolate, suberect.—Readily separated from the neighbouring Ceylon species by the hairy fruit; but may be only a form of *S. pulchra.*

50. **S. jucunda,** *Thwaites Enum.* 186; leaves cordate-oblong attenuate subentire rufous-hirsute beneath, racemes $1\frac{1}{2}$ in. rufous-hirsute, bracts linear rufous-hirsute, calyx-tube and fruit pilose. *Bedd. For. Man.* 151.

CEYLON; Deltotte and Saffragam, alt. 3–4000 ft., *Thwaites.*

A tree; branchlets densely patently rufous-hirsute. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{4}$ in., tapering from near the base, chartaceous, glabrous above; primary nerves 9 on each side the midrib, springing nearly at right angles therefrom; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Fruit* $\frac{1}{2}$ in., cylindric (Thwaites).—Nearly allied to *S. hispidula*, Thwaites, but differs in the nervation of the leaves and the linear bracts.

51. **S. angustata,** *Clarke*; leaves small oblong-lanceolate acuminate entire adpressedly fulvous-pilose on the nerves beneath, racemes 1–$2\frac{1}{2}$ in. fulvous-pilose very slender, calyx glabrous. S. elegans *var.* angustata, *Thwaites Enum.* 186, *partly.*

CEYLON; Newera Ellia, *Macrae*; Jatagama, *Thwaites* (C.P. 78).

Branchlets adpressedly shortly rufous-pilose. *Leaves* 2 by $\frac{2}{3}$ in., acute, base obtuse or rounded, glabrous except the nerves beneath, coriaceous; nervation irregular, not prominent; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Racemes* sometimes slightly compound; bracts $\frac{1}{16}$ in.; pedicels 0–$\frac{1}{8}$ in.; bracteoles $\frac{1}{24}$ in., hairy, persistent. *Calyx-tube* $\frac{1}{16}$ in., teeth $\frac{1}{16}$ in., round. *Petals* $\frac{1}{8}$ in. *Fruit* $\frac{1}{3}$ by $\frac{1}{8}$ in., ovoid-cylindric smooth; calyx-rim nearly as wide as the upper part of the fruit, teeth somewhat enlarged, suberect.

52. **S. latiflora,** *Clarke*; leaves oblong acuminate serrulate hispid on the nerves beneath, racemes $\frac{1}{2}$–$1\frac{1}{2}$ in. villous bracteate, calyx-tube glabrous, flowers large. S. hirsuta, *Wight & Gardn. in Thwaites Enum.* 185, *excl. var.* β; *not of A. DC.*

CEYLON; alt. 5–8000 ft., *Walker, Gardner, Thwaites.*

A tree; branchlets fulvous-hispid. *Leaves* $3\frac{1}{4}$ by 1 in., base obtuse or rounded, serrulate nearly to the base, chartaceous; nerves 7 pairs, irregular; petiole $\frac{1}{6}$ in. *Bracts* $\frac{1}{6}$ in., ovate, villous; pedicels 0–$\frac{1}{10}$ in.; bracteoles $\frac{1}{10}$ in., ovate, villous. *Calyx-tube* $\frac{1}{12}$ in., teeth $\frac{1}{10}$ in., round. *Petals* $\frac{1}{5}$ in., round. *Stamens* 80–100. *Disc* and

style glabrous. *Fruit* $\frac{1}{4}$ by $\frac{1}{6}$–$\frac{1}{5}$ in., ellipsoid, smooth; calyx-rim scarcely $\frac{1}{10}$ in., broad; lobes $\frac{1}{8}$ in., patent.

53. **S. minor,** *Clarke*; leaves small elliptic subobtuse serrulate hispid on the nerves beneath, racemes $\frac{1}{2}$–1$\frac{1}{2}$ in. patently fulvous-hirsute, calyx-tube glabrous. S. hirsuta, *Thwaites Enum.* 185, var. β minor, *mostly*. S. elegans, *Thwaites l. c.*, var. β, *partly*.

Ceylon; *Macrae, Walker, Gardner, Thwaites* (C.P. 273, 155).

Leaves 1$\frac{1}{4}$ by $\frac{3}{4}$ in., obtuse or very suddenly acute, base rounded, coriaceous, margin recurved, nervation strong beneath. *Bracts* caducous. *Fruit* $\frac{1}{2}$ by $\frac{1}{5}$ in., cylindric, smooth; calyx-rim as wide as the top of the fruit.—Allied to *S. latiflora*, and treated as a variety of it by Thwaites, but there are no examples intermediate between the two forms.

Var. *eugenioides*, Champ. ms.; branchlets adpressedly fulvous-pilose at the tips only, leaves very small glabrous or nearly so, racemes scarcely $\frac{1}{4}$ in. long 1–2- (rarely 4-) flowered nearly glabrous.—Ceylon, *Walker*; Horton Plains, *Champion*.

Var. *glabrescens*, Thwaites ms.; branchlets early glabrous, leaves coriaceous, racemes short few-flowered densely fulvous-villous.—Ceylon; Central Provinces, alt. 6000 ft., *Thwaites*.—Resembles *S. microphylla*. Placed with *S. minor* by Thwaites, but differs in the glabrousness of the leaves, and dense fulvous hairy spikes.

54. **S. elegans,** *Thwaites Enum.* 185, var. *a only*; leaves broadly elliptic acutely acuminate adpressed rufous-hirsute on the midrib beneath, racemes $\frac{1}{2}$–1$\frac{1}{2}$ in. slender rufous-hairy, calyx glabrous. *Bedd. For. Man.* 151.

Ceylon; alt. 5–7000 ft., *Champion, Thwaites.*

Possibly a var. of *S. latiflora*, Clarke. *Leaves* 2 by 1 in., base rounded, slightly crenate-serrate. *Racemes* more slender, bracts narrower, flowers smaller than in *S. latiflora.*

55. **S. hebantha,** *Thwaites ms.*; leaves elliptic acuminate subentire glabrescent, spikes 1–3 in. densely villous, calyx-tube glabrous teeth silky.

Ceylon; Songalla, *Thwaites* (C.P. 3918).

Branchlets villous. *Leaves* 3$\frac{3}{4}$ by 2 in., base rounded, coriaceous, sparsely pilose on the nerves beneath; nerves 7 pairs, conspicuous beneath, sub-parallel; petiole $\frac{2}{5}$ in. *Spikes* stout, dense; bracts more than $\frac{1}{4}$ in., ovate, densely hairy.—This may be a Ceylon form of *S. Beddomei*; but differs in the leaves rounded at the base, less crenate.

56. **S. cordifolia,** *Thwaites Enum.* 187; leaves large cordate elliptic nearly sessile glabrous, spikes stout densely villous crowded near the ends of the branches, calyx-tube glabrous teeth villous. *Bedd. For. Man.* 151.

Ceylon; alt. 6–7000 ft., *Macrae*, &c.

A tree; branchlets thick. *Leaves* 6 by 2$\frac{3}{4}$ in. (sometimes much larger), scarcely acute, rounded or attenuate at the base but always cordate at the petiole, minutely denticulate, coriaceous; nerves 13 pairs, distinct beneath; petiole 0–$\frac{1}{6}$ in. *Spikes* 2–4 in., often 8–12 quasi-fasciculate at the ends of the branches; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., ovate, villous. *Calyx-tube* $\frac{1}{10}$ in., teeth $\frac{1}{8}$ in. *Petals* $\frac{1}{4}$ in., elliptic. *Stamens* 60. *Disc* hairy. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in., cylindric; calyx-teeth enlarged, triangular, densely hairy.

57. **S. apicalis,** *Thwaites Enum.* 187; leaves large obovate-lanceolate acuminate glabrous, spikes 1–2 in. hirsute, calyx-tube hairy. *Bedd. For. Man.* 151.

Ceylon; *Moon*; Reigam Corle and between Ratnapoora and Galle at no great elevation, *Thwaites.*

Subarboreous (*Thwaites*); branchlets hairy, afterwards nearly glabrous. *Leaves* clustered at the end of the branchlets or the lower sometimes whorled, 13 by 5 in.,

base attenuated, sometimes very shortly cordate at the petiole, nearly entire, stoutly chartaceous; nerves 13 pairs, prominent beneath; petiole $\frac{1}{10}$–$\frac{1}{3}$ in. *Bracts* $\frac{1}{5}$ in., ovate, black-hirsute, subpersistent. *Fruit* more than $\frac{1}{2}$ by $\frac{1}{5}$ in., cylindric, villous finally glabrescent; calyx-rim as wide as the fruit, teeth $\frac{1}{8}$ in., triangular, acute, suberect, villous.

58. **S. marginalis,** *Thwaites Enum.* 187; leaves elliptic acute coriaceous densely ferruginous-hirsute on the nerves beneath, spikes 3–6 in. densely ferruginous-hirsute, calyx-tube and young fruit densely ferruginous-hirsute. *Bedd. For. Man.* 151.

CEYLON; Ambagamowa District, *Thwaites.*

A tree; branchlets stout, densely ferruginous-hirsute. *Leaves* 6 by 3 in., base obtuse or rounded, subentire, rugose, glabrous above; nerves 13 pairs, very prominent and thick beneath; petioles $\frac{1}{4}$–$\frac{1}{3}$ in. *Spikes* very stout; bracts deciduous. *Disc* villous. *Fruits* (half-ripe) $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid; calyx-teeth $\frac{1}{6}$ in., elliptic.

59. **S. coronata,** *Thwaites Enum.* 187; leaves large oblong or elliptic narrowed at both ends serrulate fulvous-villous on the nerves beneath, spikes 1–3 in. fulvous-villous, calyx-tube and young fruit softly villous. *Bedd. For. Man.* 152.

CEYLON; alt. 2–4000 ft., *Macrae*, &c.

A tree. *Leaves* attaining 12 by $3\frac{1}{2}$ in., attenuate downwards but shortly cordate at the petiole, closely but minutely serrulate, coriaceous; nerves 13 pairs, much elevated beneath, reticulations very prominent beneath; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Spikes* dense with flowers nearly to their base; bracts $\frac{1}{5}$ in., ovate, villous, subpersistent. *Calyx-tube* $\frac{1}{16}$ in.; teeth $\frac{1}{10}$ in., oblong, densely silky. *Petals* $\frac{1}{6}$ in., appear to have been red or purple. *Stamens* 50. *Fruit* (half-ripe) $\frac{1}{3}$ by $\frac{1}{4}$ in., ovoid, hairy; calyx-teeth $\frac{1}{8}$ in., suberect.

VAR. *obovata*; leaf 7 by $4\frac{3}{4}$ in. broadly obovate.—Ceylon.

SUBGENUS II. **Ciponima** (including CORDYLOBLASTE). *Petals* distinctly connate, tube often elongate; flower-buds obovate-oblong or clavate. *Filaments* adnate to the corolla throughout the tube, and often produced as a free tube. *Calyx-tube* produced much above the ovary, free, with short lobes.

60. **S. pendula,** *Wight Ic.* t. 1237; glabrous, leaves elliptic subentire, peduncles $\frac{1}{8}$–$\frac{1}{6}$ in. 1-flowered pendulous in bud, corolla-tube $\frac{1}{8}$ in. *Bedd. For. Man.* 152.

MALABAR and TRAVANCORE MTS.; alt. 4-6000 ft., common, *Wight, Beddome.*

A tree. *Leaves* $2\frac{1}{2}$ by 1 in., obtuse, base cuneate, coriaceous; nerves irregular, distinct beneath; petiole $\frac{1}{6}$ in. *Peduncles* solitary or 1–3 together; bracteoles $\frac{1}{24}$ in., minutely ciliate. *Calyx-tube* $\frac{1}{8}$ in., lobes scarcely $\frac{1}{24}$ in. *Corolla* in bud $\frac{1}{3}$ in. *Stamens* 40–60; no free staminal tube. *Disc* and *style* glabrous. *Fruit* not seen.

61. **S. pauciflora,** *Wight ms.*; nearly glabrous, leaves elliptic subentire, peduncles $\frac{1}{4}$–$\frac{3}{4}$ in. 1-flowered always erect, corolla-tube $\frac{1}{8}$ in. S. pendula, *Thwaites Enum.* 184.

CEYLON; *Wight*, &c.; alt. 5-8000 ft., abundant, *Thwaites.*

Perhaps only a Ceylon form of *S. pendula* as Thwaites supposes, but the peduncles are always much longer and slenderer, at no time pendulous, often several-flowered with very long pedicels, not rarely rusty-pubescent. *Fruit* (unripe) $\frac{1}{3}$ by $\frac{1}{5}$ in., cylindric, curved.

62. **S. sessilis,** *Clarke*; glabrous, leaves obovate-oblong obtuse subentire, flowers solitary sessile or subsessile erect, corolla-tube $\frac{1}{8}$ in.

TRAVANCORE MTS., *Beddome.*

Differs from *S. pendula* in the erect, smaller flowers; from *S. pauciflora* in the

want of peduncles; considered a var. of *S. pendula* by Beddome (*For. Man.* 152), but ranked as a species by Benth. (Gen. Pl. ii. 669).

63. **S. Henscheli,** *Benth. in Gen. Pl.* ii. 669; leaves elliptic-oblong narrowed at both ends subentire ultimately nearly glabrous, racemes small ashy silky, corolla-tube $\frac{1}{8}$–$\frac{1}{4}$ in. subglabrous. Cordyloblaste Henscheli, *Moritzi in Bot. Zeit.* 1848, 606.

MALACCA; Mt. Ophir, *Griffith* (Kew Distrib. n. 3644), *Lobb.*

Branchlets sparsely pilose. *Leaves* 4 by $1\frac{3}{4}$ in., sometimes obscurely pubescent beneath, coriaceous; nerves irregular, indistinct; petiole $\frac{1}{4}$ in. *Racemes* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., 1–5-flowered; bracts minute; pedicels 0–$\frac{1}{8}$ in. *Calyx-tube* $\frac{1}{8}$ in., grey-silky, lobes scarcely $\frac{1}{24}$ in. *Corolla* in bud $\frac{1}{3}$ by $\frac{1}{8}$ in. *Stamens* 40–60; staminal tube $\frac{1}{10}$ in., free. *Disc* villous; style $\frac{1}{3}$–$\frac{1}{2}$ in., glabrous, stigma large capitate. *Fruit* not seen.

VAR. *hirtistylis*; flowers rather larger, style hirsute.—Mt. Ophir; *Maingay* (n. 2586, herb. prop.).

64. **S. Maingayi,** *Benth. in Gen. Pl.* ii. 669; leaves elliptic narrowed at both ends sparsely pubescent beneath, racemes dense ferruginous hairy, corolla-tube 1 in. silkily white-tomentose without.

MALACCA; *Maingay* (Kew Distrib. n. 961).

Branchlets stout, rusty-hirsute. *Leaves* $4\frac{1}{2}$ by 2 in., subentire, coriaceous; nerves irregular, indistinct; petiole $\frac{1}{4}$ in. *Racemes* 1 in., stout; bracts $\frac{1}{5}$ in., ovate, ferruginous-hairy; pedicels 0–$\frac{1}{8}$ in.; bracteoles minute. *Calyx-tube* $\frac{1}{6}$ in., hairy, teeth $\frac{1}{20}$ in. *Corolla-tube* narrow, glabrous within; lobes $\frac{1}{2}$ in., elliptic. *Stamens* 40–60, staminal tube $\frac{1}{5}$ in., free, dividing into 20 ligulate lobes. *Disc* and *style* hairy. *Ovary* 3–5-celled with 1 pendulous ovule in each cell (*Maingay*). *Fruit* $1\frac{3}{4}$ by $1\frac{1}{4}$ in., obovoid, obtuse, glabrescent; endocarp very thick, woody; calyx-rim $\frac{1}{8}$ in. wide, less than one-tenth the width of the upper part of the fruit.

2. STYRAX, *Linn.*

Trees and shrubs. *Leaves* elliptic-lanceolate. *Flowers* in lax little-divided axillary and terminal racemes, or subsolitary axillary: bracts inconspicuous. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short, lobes 5, elliptic-oblong, imbricate (in the Indian species). *Stamens* 10, 1-seriate at the summit of the corolla-tube, filaments short; anthers large, linear. *Ovary* nearly free, at first 3-celled, later often 1-celled; style subulate, stigma capitate; ovules few in each cell. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, toughly chartaceous (in the Indian species), breaking up irregularly. *Seeds* rarely 2 (many in *S. polysperme*), erect, testa chartaceous or indurated, albumen plentiful fleshy; embryo straight, cotyledons broad.—Species 60, in the warmer regions of Eastern Asia and America.

S. Finlaysonianum, Wall. Cat. 4403, A. DC. Prodr. viii. 261, with subentire nearly glabrous leaves (*S. odoratissimum*, Champ. in Hook. Kew. Journ. iv. 304) was collected probably in Cambodia, and is not known as an Indian plant.

1. **S. serrulatum,** *Roxb. Fl. Ind.* ii. 415; leaves elliptic acuminate serrulate glabrous or with scattered stellate hairs beneath, pedicels and calyx closely white-tomentose, corolla $\frac{1}{3}$ in., style glabrous. *Wall. Cat.* 4402; *A. DC. Prodr.* viii. 267; *Hk. f. in Bot. Mag.* t. 5950, *syn. excl.*; *Kurz in Journ. As. Soc.* 1877, pt. ii. 237, and *For. Fl.* ii. 142. S. Porterianum, *Wall. Cat.* 4401; *A. DC. l.c.* S. floribundum, *Griff. Notul.* iv. 287.

EASTERN INDIA; alt. 3–7000 ft., frequent; from Nipal and Bhotan to Pegu and Penang.

A tree, sometimes 40 ft. high, or more often a shrub; young branches stellately pubescent. *Leaves* 3 by 1½ in., often widest at or above the middle, base acute or rounded on the same branch, glabrous, rarely setulose above, stellately pubescent and soon glabrate beneath, chartaceous, prominently reticulate; petiole $\frac{1}{5}$ in. *Peduncles* axillary solitary, 2–3-fasciculate, or in small racemes, or (by the suppression of the leaves) subpaniculately racemed 3–5 in. long at the ends of the branchlets; pedicels $\frac{1}{3}$ in. *Calyx* (at flower time) $\frac{1}{8}$ in. broad, minutely 5-toothed or truncate. *Corolla-lobes* elliptic, subacute, tomentose without, white. *Filaments* hairy, attached $\frac{1}{8}$ in. above the corolla-base. *Fruit* $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid, white- or fulvous-tomentose; splitting up irregularly, calyx in fruit enlarged cupuliform $\frac{1}{3}$ in. wide embracing the lower quarter of the fruit.

VAR. *agrestis*; calyx-tube brown-hirsute with spreading hairs. Cyrta agrestis, *Ham. in Wall. Cat.* 4402.—Sikkim, Bhotan and Assam.

VAR. *virgatum*; leaves tapering acuminate usually widest below the middle, flowering-calyx $\frac{1}{8}$–$\frac{1}{4}$ in. wide, corolla $\frac{1}{3}$–$\frac{2}{3}$ in., segments wider. S. virgatum, *Wall. Cat.* 4400; *A. DC. Prodr.* viii. 267; *Kurz in Journ. As. Soc.* 1877, pt. ii. 237, and *For. Fl.* ii. 142. S. grandiflorum, *Griff. Notul.* iv. 267, and *Ic. Pl. Asiat.* t. 423.—From Sikkim and Bhotan to Pegu. Distrib. South China, Japan.—S. japonicum, *Sieb. & Zucc. Fl. Jap.* i. 53, t. 23, united with this in Bot. Mag. t. 5950, somewhat differs in the glabrescent calyx and pinkish flowers.

2. **S. Hookeri,** *Clarke*; leaves elliptic acuminate serrulate setulose on the nerves above with scattered stellate hairs beneath, pedicels and calyx loosely fulvous-tomentose, corolla $\frac{1}{2}$–$\frac{3}{4}$ in., style densely stellate-pubescent. Styrax sp., *Gamble Darjeeling List*, 54.

SIKKIM and BHOTAN; alt. 6–7000 ft., frequent, *Hook. f.*, &c.

Perhaps only an extreme form of *S. serrulatum*, var. *virgatum*, but the flowers are much larger sometimes 1 in. long; the calyx at flower-time is more than $\frac{1}{4}$ in. broad, lax. *Fruit* as of *S. serrulatum*.

3. **S.? crotonoides,** *Clarke*; leaves broad-oblong shortly acuminate at both ends subentire coriaceous stellately pubescent beneath, fruit $\frac{3}{4}$ by $\frac{2}{3}$ ellipsoid indehiscent supported by a woody cupuliform calyx. Crotoni affinis sp., *Wall. Cat.* 7848.

SINGAPORE; *Wallich.*

Branches rusty-stellate-pubescent. *Leaves* 5 by 2¼ in., glabrous above, almost tomentose, with very close rusty-stellate hairs beneath; nerves 9 pairs, prominent beneath; petiole $\frac{1}{3}$ in. *Fruits* with hard white tomentum (ripe but broken up and the seeds gone).—This agrees, as to leaves and fruit, closely with *S. suberifolium* (Hk. & Arn. Bot. Beechey Voy. 196, t. 40), but has much larger leaves and fruits.

4. **S. Benzoin,** *Dryand. in Phil. Trans.* 1787, 308, t. 12; leaves elliptic acuminate subentire closely stellately tomentose beneath, pedicels and calyx closely white-tomentose, corolla $\frac{1}{3}$ in., style glabrous. *Blume Bijd.* 671; *Roxb. Fl. Ind.* ii. 416; *A. DC. Prodr.* viii. 261; *Bentl. & Trim. Med. Pl.* iii. t. 169.

MALACCA; *Griffith, Maingay.*—DISTRIB. Malaya.

A small tree, resembling *S. serrulatum* in the inflorescence and flowers. *Fruit* $\frac{1}{3}$ in. diam., globose, densely white tomentose.

5. **S. rugosum,** *Kurz in Journ. As. Soc.* 1871, pt. ii. 51, and *For. Fl.* ii. 141; leaves elliptic acuminate serrulate densely stellately white-tomentose beneath, pedicels and calyx roughly tomentose, corolla $\frac{2}{3}$ in., style stellately tomentose at base.

MARTABAN; alt. 4–6000 ft., *Brandis.*

A tree; branchlets floccosely rusty-tomentose. *Leaves* 3 by 1¼ in., base obtuse, stellately pubescent or finally glabrous above, coriaceous, reticulate beneath; petiole $\frac{1}{5}$ in. *Flowers* axillary, and quasi-racemed towards the ends of the branches, pen-

dulous; peduncle $\frac{1}{10}$ in.; bracteoles linear, sometimes $\frac{1}{4}$ in. *Calyx* rusty floccose-tomentose, subspathaceous, irregularly lobed and often serrate. *Corolla* closely tomentose without. *Filaments* villous. *Fruit* not seen.

6. **S. polysperma,** *Clarke*; leaves broadly oblong acute obscurely crenate glabrous, corymbs many-flowered scabrous, corolla $\frac{1}{4}$–$\frac{1}{3}$ in., fruit 5–6-seeded.

KHASIA MTS.; *Griffith*; Mahadeo, alt. 3000 ft., *H. f. & T.*

Branches glabrous. *Leaves* 6 by $2\frac{1}{4}$ in., base cuneate or rhomboid; petiole $\frac{1}{2}$ in. *Corymbs* subterminal, repeatedly dichotomous, flowers nearly sessile. *Corolla* densely tomentose without. *Style* obscurely 3-lobed. *Fruit* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid, subacute, imperfectly 3-celled; cells 2–1-seeded; testa stoutly chartaceous.—A most remarkable plant; the glabrous leaves and compound dichotomous inflorescence have caused fruiting examples to be referred to *Cordia*. The fruit is altogether unlike that of any other *Styrax*, and may indicate a new genus.

ORDER XCII. **OLEACEÆ.** (By C. B. Clarke.)

Trees, or scandent or erect shrubs, unarmed. *Leaves* opposite (in a few Jasminums alternate), simple 3-foliolate or pinnate, entire or toothed; stipules 0. *Inflorescence* mostly in trichotomous cymes or panicles, terminal or axillary, rarely fascicled or racemose. *Flowers* hermaphrodite often dimorphous, sometimes polygamous or diœcious, regular. *Calyx* small, truncate or 4- (sometimes 5–9-) lobed, rarely 0. *Corolla* monopetalous, rarely 4–9-petalous or 0, tube long or short, imbricate or valvate in bud. *Stamens* 2 (in Indian species), inserted on the corolla, or (in the polypetalous or apetalous genera) hypogynous, filaments usually short; anthers dehiscing usually on the margin or subextrorsely. *Ovary* free, 2-celled; style short or long, stigma simple or 2-lobed; ovules 1–2 (rarely 3–4) in each cell, attached to the inner angle near the apex or base. *Fruit* a loculicidal capsule, or indehiscent, or a berry or drupe. *Seeds* solitary (or 2) in each cell, erect or pendulous; testa thin or bony, albumen fleshy horny or 0; embryo straight, radicle superior or inferior.—DISTRIB. Species 280, in the tropical and temperate regions.

A shrub, collected by Helfer in Tenasserim or the Andamans (Kew Distrib. n. 3694) is supposed to belong to this Order; the imperfect specimens are here described. *Branches* round; wood loose, soft; bark white, smooth. *Leaves* opposite, 10 by $3\frac{1}{3}$ in., cuneate at both ends, entire, softly hairy on the nerves beneath, coriaceous, whitened beneath, primary nerves 12 on each side the midrib, prominently inarching; petiole $\frac{1}{4}$ in., hairy, very turgid. *Panicles* 1 in., axillary, reduced almost to racemes, minutely pubescent; bracts 0 or minute; pedicels hardly any. *Ovary* (in young fruit) superior, 2-celled; cells 2-ovuled ?.

TRIBE I. **Jasmineæ.** *Corolla-lobes* much imbricate. *Seeds* erect; albumen 0; radicle inferior.

Scandent shrubs; fruit baccate . . . . 1. JASMINUM.
Erect small tree; capsule bipartite . . . . 2. NYCTANTHES.

TRIBE II. **Syringeæ.** *Fruit* dry, loculicidal. *Seeds* pendulous, winged, radicle superior.

Corolla-lobes imbricate; fruit woody, pyriform . . . . 3. SCHREBERA.
Corolla-lobes valvate; fruit small, cylindric . . . . 4. SYRINGA.

TRIBE III. **Fraxineæ.** *Fruit* samaroid. *Petals* valvate or 0.

Trees; leaves pinnate . . . . 5. FRAXINUS.

TRIBE IV. **Oleineæ.** *Fruit* a drupe or berry. *Corolla* small. *Radicle* superior (except *Myxopyrum*).

* *Corolla-lobes imbricate; seeds albuminous.*

Flowers fascicled or in very short racemes . . . . 6. OSMANTHUS.

** *Corolla-lobes valvate or petals distinct in pairs or* 0.

Petals in pairs or distinct or very shortly united into a tube, inflorescence axillary . . . . 7. LINOCIERA.
Corolla tubular or 0, inflorescence axillary except in *O. glandulifera* . . . . 8. OLEA.
Panicles terminal . . . . 9. LIGUSTRUM.
Large scandent shrubs, leaves 3-nerved . . . . 10. MYXOPYRUM.

1. JASMINUM, *Linn.*

Shrubs, scandent or erect. *Leaves* opposite or alternate, simple 3-foliolate or unequally pinnate; petiole nearly always articulated. *Cymes* 3- or 2-chotomous, simple or flowers rarely solitary; bracts linear and small, or ovate, sometimes petaloid. *Calyx* 4–9-fid, tube funnel-shaped rarely subcylindric, teeth linear long or short or 0. *Corolla* salver-shaped, white pink or yellow, tube narrow, lobes 4–10, patent, imbricate in bud. *Stamens* 2, included in the corolla-tube, filaments very short; anther oblong, connective usually shortly produced and triangular. *Ovary* 2-celled; style cylindric, stigmas 2 linear, long or short or subcombined; ovules 2 in each cell, near the base. *Berry* didymous, or often, by suppression, simple; carpels globose ellipsoid or elongate. *Seed* in each carpel 1, rarely 2, erect, exalbuminous; radicle inferior.—DISTRIB. Species 90, in the tropics or warm temperate parts of the Old World.

* Leaves all simple.

† *Calyx pubescent.* (The series proceeds from the species with long to those with short calyx-teeth.)

The species are generally dimorphic, having a long- and a short-styled form: Wight founded two species on this solitary character out of *J. auriculatum*. It has not been found practicable to use characters drawn from the style and stigma in the discrimination of the species.

1. **J. Sambac,** *Ait. Hort. Kew.* i. 8; leaves short-petioled ovate nearly glabrous, cymes lax few-flowered, bracts small, calyx-teeth subulate. *Bot. Reg.* t. 1; *Bot. Mag.* t. 1785; *Wall. Cat.* 2868; *DC. Prodr.* viii. 301; *Wight Ic.* t. 704; *Dalz. & Gibs. Bomb. Fl.* 137; *Brand. For. Fl.* 311; *Kurz For. Fl.* ii. 153, *in Journ. As. Soc.* 1877, pt. ii. 242. J. fragrans, *Salisb. Prodr.* 12. J. undulatum, *Willd. Sp. Pl.* i. 36, *not of Ker.* J. Zambac, *Roxb. Hort. Beng.* 2, *Fl. Ind. ed. Carey & Wall.* i. 87. J. quinqueflorum, *Heyne*; *Wall. Cat.* 2878; *DC. l.c.* 302. J. pubescens, *Wall. Cat.* 2880, *not of Willd.* Nyctanthes Sambac *and* undulatum, *Linn. Sp. Pl.* 8. Mogorium Sambac, *Lamk. Dict.* iv. 210, *Ill.* t. 6, fig. 1. M. undulatum, *Lamk. Dict.* iv. 212.—*Rheede Hort. Mal.* vi. tt. 50, 51, 55. *Burm. Thes. Zeyl.* t. 58, fig. 2. Mallica, Asphota *and* Suptula, *Jones in As. Research.* iv. 245.

BENGAL to CEYLON and BIRMA; alt. 0–2000 ft., common.—DISTRIB. Much cultivated throughout India, and in the tropics of both hemispheres.

Scandent; branchlets pubescent. *Leaves* opposite or sometimes ternate, thinly membranous, varying from 1 to 5 in., sometimes on the same bush, acute or obtuse, base cuneate or rounded, nerves beneath pubescent or glabrous, primary often tufted in the axils beneath, secondary nerves distinct; petiole $\frac{1}{5}$ in. *Cymes* about 3-flowered

(or many-flowered in cultivation), pubescent; pedicels 0–¼ in., usually distinct; bracts 0–¼ in., linear; flowers white, fragrant. *Calyx-teeth* ¼ in., pubescent (in cultivation often nearly glabrous). *Corolla-tube* ½ in.; lobes ½ in., oblong, acute or obtuse, or in cultivation orbicular. *Ripe carpels* 1–2, globose, ¼ in. diam., black, surrounded by the suberect subulate calyx-teeth.

VAR. 1. *Sambac proper*; corolla-tube not twice the length of the calyx.

VAR. 2. *Heyneana*, Wall. Cat. 2871 (sp.); leaves small, corolla-tube 2–5 times as long as the calyx-teeth.—Deccan Peninsula; *Heyne*. *Leaves* 1–1½ in. *Calyx-teeth* $\frac{1}{16}$–⅛ in. *Corolla-tube* ½ in. *Style* sometimes as long as corolla-tube (unlike any in *J. Sambac* type, but in this polymorphic genus, little reliance can be placed on this character). Forms of *J. Sambac* approaching this var. are in cultivation in Bengal; it appears from Rottler's herb. to have been (as Wallich records under Wall. Cat. 2871) the typical *J. undulatum*, Heyne, and therefore of Linnæus, Willd., and the older authors. It is probably a cultivated var. of *J. Sambac* as none of the examples appear to be native ones.

2. **J. undulatum,** *Ker in Bot. Reg.* t. 436, *not of Willd.*; leaves short-petioled ovate-lanceolate pubescent on the nerves beneath, cymes dense often hardly exceeding the uppermost leaves, calyx-teeth ⅙–⅓ in. subulate pubescent. *DC. Prodr.* viii. 302, *syn. excl.* J. amplexicaule *and* J. aristatum, *Wall. Cat.* 2853 and 2875; *DC. Prodr. l. c.* 306, 314. J. scandens, *Griff. Itin. Notes*, 102, *not of Vahl.*—Jasminum sp. n. 597, *Griff. Itin. Notes*, 36. Jasminum sp. n. 33, *Herb. Ind. Or. H. f. & T.*

SIKKIM, BHOTAN and KHASIA, alt. 1–5000 ft., common; *Griffith, H. f. & T.*, &c.—DISTRIB. South China to Hongkong.

Scandent; branchlets hairy. *Leaves* 2½ by 1 in., acute, base rounded often cordate, obscurely hairy or usually glabrescent except the nerves beneath; secondary nervation obscure; petiole ⅕ in. *Cymes* capitate, often on short lateral branches; pedicels 0–$\frac{1}{10}$ in., pilose or nearly glabrous; bracts 0, or 1–3 ovate-lanceolate among the flowers, the two subtending leaves green, often 1 in. long. *Flowers* white, somewhat fragrant. *Corolla-tube* ¾ in., lobes ¼ in., oblong, acute. *Carpels* 1–2, globose, ¼ in. diam., black, surrounded by the suberect subulate calyx-teeth.

3. **J. pubescens,** *Willd. Sp. Pl.* i. 37; hairy, leaves ovate acute, cymes dense often hardly exceeding the uppermost leaves, calyx-teeth ⅕–⅜ in. subulate densely villous. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 90; *Don Prodr.* 105; *DC. Prodr.* viii. 302; *Dalz. & Gibs. Bomb. Fl.* 138. J. hirsutum, *Willd. l. c.* 36; *Smith Exot. Bot.* ii. 117, t. 118; *Bot. Reg.* t. 15; *Bot. Mag.* t. 1991; *Wall. Cat.* 2852; *Wight Ic.* t. 702; *Brand. For. Fl.* 312; *Kurz For. Fl.* ii. 154, and *in Journ. As. Soc.* 1877, pt. ii. 242. J. multiflorum, *Roth Nov. Sp.* 6 (?); *Andr. Bot. Rep.* t. 496; *DC. l. c.* 303. J. congestum, *Wall. Cat.* 2874; *DC. l. c.* 314. J. bracteatum (by error *fractiatum*), *Wight Ic.* t. 1248; *Dalz. & Gibs. Bomb. Fl.* 138. Nyctanthes pubescens, *Retz Obs.* v. 9. N. multiflora, *Burm. Fl. Ind.* 5, t. 3, fig. 1. Mogorium pubescens, *Lamk. Dict.* iv. 213.

INDIA, from the HIMALAYA to CEYLON and TENASSERIM, alt. 0–3000 ft., common.—DISTRIB. Birma, China.

Scandent; branchlets, pedicels and calyx densely fulvous-villous. *Calyx-teeth* with patent yellow hairs, erect or curved in fruit. Otherwise as in *J. undulatum*, Ker, which has more acuminate, less hairy leaves.—Nyctanthes hirsuta, *Linn. Sp. Pl.* 8, is generally taken for this and the name *hirsutum* preferred, but Linnæus founded his plant on *Rheede Hort. Mal.* vi. t. 48, which is not *J. pubescens*. *Rheede Hort. Mal.* vi. t. 54 is usually quoted for *J. pubescens*, but from the shape of the leaves it seems more likely to be *J. Rottlerianum* or *J. Thwaitesii*. The name *J. multiflorum*, Roth, has been much disputed: Roth says he took it from Heyne, but Heyne's original plant with the ticket descriptive of *J. multiflorum*, in his handwriting, is preserved in Herb. Wight, and is *J. Rottlerianum*. This however could not have been

the plant described by Roth, as he says the bracts were linear. The example of *J. multiflorum* in Herb. Roxb. is *J. pubescens.*

VAR. *bracteata*, Roxb. Hort. Beng. 3, Fl. Ind. ed. Carey & Wall. i. 92 (sp.); leaves somewhat bifarious, bracts linear small, calyx-teeth $\frac{1}{6}$–$\frac{1}{4}$ in., corolla-tube $\frac{1}{4}$–$\frac{3}{4}$ in. Wall. Cat. 2867; DC. Prodr. viii. 305.—Penang; *Wallich.*—DISTRIB. Sumatra.—This was supposed allied to or a var. of *J. bifarium*, from which it does not much differ but by the longer calyx-teeth. The corolla-tube, which is figured as very short in Roxburgh's drawing, is $\frac{3}{4}$ in. in some of Wallich's specimens.

4. **J. coarctatum,** *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 91; leaves elliptic acute nearly glabrous, petioles jointed, flower-heads solitary or subpaniculate, bracts prominent white ovate-lanceolate, calyx-teeth linear hairy. *DC. Prodr.* viii. 308; *Kurz For. Fl.* ii. 153, and *in Journ. As. Soc.* 1877, pt. ii. 242. J, reticulatum, *Wall. Cat.* 2869; *DC. l. c.* 303.—Jasminum, n. 34, *Herb. Ind. Or. Hk. f. & T.*

From ASSAM to PEGU, alt. 0–3000 ft., frequent; *Wallich, Griffith*, &c.

Scandent; branchlets hairy. *Leaves* 4$\frac{1}{2}$ by 2 in., usually acuminate, base obtuse or rounded, midrib above pilose or glabrous, often tufted in the axils of the nerves beneath, membranous, secondary nervation somewhat prominent; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Cymes* dense, many-flowered, rusty-pubescent; bracts $\frac{1}{3}$–1 in., petaloid, acuminate, often ciliate or pilose. *Flowers* white. *Calyx-teeth* $\frac{1}{5}$–$\frac{1}{3}$ in. *Corolla-tube* 1–1$\frac{1}{4}$ in.; lobes $\frac{1}{2}$–$\frac{2}{3}$ in., oblong, acute. *Carpels* $\frac{1}{2}$ by $\frac{1}{3}$ in., and upwards.

5. **J. Rottlerianum,** *Wall. Cat.* 2865; leaves elliptic acute softly hairy on both surfaces or glabrate, petioles jointed, flower-heads solitary or subpaniculate, bracts prominent white ovate-lanceolate, calyx-teeth linear hairy. *DC. Prodr.* viii. 305; *Wight Ic.* t. 1249; *Dalz. & Gibs. Bomb. Fl.* 138. J. hirsutum, *Wall. Cat.* 2852, C. J. bracteatum, *Heyne in Herb., not of Roth.* J. pubescens *and* hirsutum, *Miq. in Herb. Hohenack. not of Willd.*

MTS. of the DECCAN PENINSULA; from the Concan to Travancore, alt. 2–5000 ft., frequent; *Heyne*, &c.

Scandent; branchlets, inflorescence and bracts villous. *Leaves* often subcordate at the base, adult very villous. *Corolla-tube* 1 in., and more in Wight's examples. *Fruit-carpels* $\frac{1}{2}$ by $\frac{1}{3}$ in.—This type form looks, from its hairiness, very distinct from *J. coarctatum.*

VAR. *glabrior*; adult leaves glabrous or nearly so, inflorescence shortly pubescent, corolla-tube $\frac{3}{4}$ in. slender.—Travancore; *Wight.*—This is referred by Wallich to *J. Rottlerianum*, and there are examples intermediate in hairiness; but it is very difficult to say how it differs from *J. coarctatum*, except that the flowers are rather smaller. Kurz (For. Fl. ii. 153, and in Journ. As. Soc. 1877, pt. ii. 242) has a *J. Rottlerianum* from Pegu, with adult leaves nearly glabrous, and the corolla-tube only $\frac{1}{2}$ in. long; this plant cannot therefore resemble very closely the typical *J. Rottlerianum*, which has a tube 1–1$\frac{1}{4}$ in.; but possibly *J. coarctatum* and *Rottlerianum* should be united.

VAR. *Thwaitesii*; leaves oblong acuminate nearly glabrous, corolla-tube 1–1$\frac{1}{4}$ in., carpels $\frac{1}{4}$ in. diam. globose. J. rigidum, *Thwaites Enum.* 190, *not of Zenk.*—Ceylon; *Thwaites*, C. P. n. 1809. Nilgherries, alt. 4–7000 ft., frequent, *Clarke.*—*Branchlets* terete, pubescent. *Leaves* sometimes cordate at the base. *Bracts* several, ovate-lanceolate, whitish. *Calyx-teeth* $\frac{1}{6}$–$\frac{1}{3}$ in., linear.—This is a very difficult plant as may be guessed from Thwaites referring his specimen (though much twining) to *J. rigidum.* It does not differ much from *J. Rottlerianum*, var. *glabrior* (of which the fruit has not been seen): its small fruit is very unlike that of *J. coarctatum.*

6. **J. Griffithii,** *Clarke*; leaves large oblong-elliptic acuminate pilose beneath, heads dense many-flowered, bracts linear small or the uppermost leaves whitened, calyx-teeth long subulate patently fulvous-pilose.

MALACCA; *Griffith* (Kew Distrib. n. 3704) and *Maingay* (n. 998).

Scandent; branchlets patently fulvous-villous. *Leaves* 6$\frac{1}{2}$ by 2$\frac{3}{4}$ in., base obtuse or

cordate, coriaceous; nerves impressed above, much raised and fulvous-villous beneath, strongly tufted in their axils, prominently inarching, secondary obscure; petiole $\frac{1}{4}$ in. *Inflorescence* fulvous-pilose, subebracteate, but the upper leaves (even $3\frac{1}{2}$ in. long) whitened. *Calyx-teeth* $\frac{1}{3}$ in. *Corolla-tube* $\frac{3}{4}$ in., slender; lobes $\frac{1}{4}$ in., elliptic, acute. *Fruit* not seen.

7. **J. Maingayi,** *Clarke*; leaves long-petioled elliptic-lanceolate glabrous, flower-heads dense pubescent, bracts small linear or 1–2 ovate-lanceolate, calyx-teeth long linear pubescent.

PENANG; *Maingay* (Kew Distrib. n. 1000).

Scandent; branchlets pilose. *Leaves* 5 by 2 in., acute, base obtusely rhomboid, coriaceous; nerves 6–8 pairs, conspicuous, very oblique, not inarched, secondary obscure; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* panicled, sometimes more compound and lax; pedicels $\frac{1}{16}$–$\frac{1}{6}$ in.; bracts mostly linear, $\frac{1}{16}$–$\frac{1}{8}$ in., a few foliaceous bracts $\frac{3}{4}$ in. long occur. *Calyx-tube* $\frac{1}{8}$ in., campanulate; teeth $\frac{1}{4}$–$\frac{1}{3}$ in. *Corolla-tube* $\frac{3}{4}$ in.; lobes $\frac{1}{3}$ in., elliptic, acute. *Carpels* $\frac{1}{8}$ by $\frac{1}{4}$ in., ellipsoid.

8. **J. malabaricum,** *Wight Ic.* t. 1250; leaves subcordate ovate suddenly acuminate nearly glabrous, cymes compound hairy, calyx-teeth long linear hairy, corolla-tube elongate. J. glabellum, *Wall. Cat.* 2857, *partly.*

DECCAN PENINSULA; on the Ghats, from the Concan southwards, common, *Wight*, &c.

Scandent; branchlets pubescent. *Leaves* $4\frac{1}{4}$ by 3 in., broadest near the base, membranous; nerves 9 pairs, distinct beneath, lower patent; petiole often 1 in. *Cymes* compound, trichotomous, not dense, many- (often 40–50-) flowered, branches ascending; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., subulate; pedicels $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{4}$ in., subulate, acute. *Corolla-tube* $\frac{1}{2}$–$\frac{3}{4}$ in.; lobes $\frac{1}{2}$ in., oblong, very acute. *Fruit* not seen.—Wight first named this plant *J. cuspidatum*, but abandoned the name on finding that Roth had applied it to a very different species. Wight's figure does not show the very acute petals, which are conspicuous in his examples.

VAR. *Lawii*; leaves ovate-lanceolate gradually acuminated, corolla-lobes nearly 1 in. long very narrow.—Concan; *Law*?—These specimens have been referred to *J. erectiflorum* which has glabrous cymes and calyx-teeth, and a less compound inflorescence.

9. **J. arborescens,** *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 94; arborescent, leaves subcordate or ovate acute, finally glabrous, cymes trichotomous hairy, calyx-teeth short linear subclavate pubescent divaricated, basal sinus wide, corolla-lobes not much shorter (often longer) than the tube. *Wall. Cat.* 2856; *Wight Ic.* t. 699; *DC. Prodr.* viii. 303; *Brand. For. Fl.* 311. J. montanum, *Roth Nov. Sp.* 5; *DC. l. c.* 308. J. arboreum, *Roem. et Sch. Mant.* i. 90.

TROPICAL NORTH-WEST HIMALAYA; Terai of Oudh and Kumaon; frequent. DECCAN PENINSULA, from Rajmahl to Ceylon; in the hot lower hills, alt. 500–3000 ft., common.

A large shrub or scrubby tree; branchlets hairy. *Leaves* 4 by $2\frac{1}{2}$ in., shortly acuminate, widest near the base, subcordate or the upper ovate or elliptic, young hairy and often tomentose on both surfaces; nerves distinct beneath, lower divaricate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* usually 12–20-flowered, not dense; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{4}$ in. *Calyx-teeth* $\frac{1}{10}$–$\frac{1}{6}$ in., their narrowest part one-third of the way up. *Corolla-tube* $\frac{1}{2}$ in.; lobes $\frac{3}{4}$ in., lanceolate, acute. *Carpels* (generally solitary) $\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., unsymmetric, ellipsoid, black.

VAR. *latifolia*, Roxb. Hort. Beng. 3, and Fl. Ind. ed. Carey & Wall. i. 93 (sp.); scandent. *Wall. Cat.* 2855; *DC. Prodr.* viii. 308; *Wight Ic.* t. 703; *Dalz & Gibs. Bomb. Fl.* 138; *Brand. For. Fl.* 311.—Base of the Himalaya, from Kumaon to Bengal.

VAR. *montana*, Roth Nov. Sp. 5 (sp.); leaves elliptic cuneate scarcely rounded at

the base, calyx minutely pubescent. *DC. Prodr.* viii. 308. J. punctatum, *Wall. Cat.* 2877; *DC. l. c.* 303.—J. glabellum, *Wall. Cat.* 2857, *partly.*—Deccan Peninsula; Patna.

10. **J. Roxburghianum,** *Wall. Cat.* 2870; leaves elliptic-oblong softly hairy, cymes trichotomous very hairy, calyx-teeth minute narrowly triangular villous, corolla-lobes usually as long as the tube. *DC. Prodr.* viii. 314.

MALABAR GHATS, *Ritchie*; Bababoodun Hills, *Law.*

Perhaps a var. of *J. arborescens,* but much more hairy, and with shorter calyx-teeth. *Leaves* not acuminate, sometimes obtuse, base broadly cuneate or scarcely rounded, mature softly hairy on both surfaces. *Cyme* somewhat lax, many-flowered. *Calyx* densely fulvous-villous teeth $\frac{1}{20}$–$\frac{1}{10}$ in. *Corolla* and fruit as in *J. arborescens.*

11. **J. syringæfolium,** *Wall. Cat.* 2861; leaves ovate-lanceolate acuminate glabrous, cymes lax trichotomous minutely pubescent, calyx-teeth short linear erect pubescent, corolla-lobes shorter than the tube. *DC. Prodr.* viii. 306.

TENASSERIM, Amherst and Tavoy; *Wallich, Packman.* ASSAM; *Griffith.*

Scandent; branchlets glabrescent. *Leaves* 4 by $1\frac{3}{4}$ in., broadly cuneate or the lower leaves rounded at the base, coriaceous; nerves 3–5 pairs, prominent beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., mostly pubescent. *Cymes* terminal and axillary, 12–20-flowered; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in. *Calyx-teeth* $\frac{1}{16}$–$\frac{1}{12}$ in. *Corolla-tube* $\frac{2}{3}$ in.; lobes scarcely $\frac{1}{2}$ in., narrow, acute. *Fruit-carpels* $\frac{2}{3}$ by $\frac{1}{3}$ in., unsymmetric, ellipsoid.—Kurz (*Journ. As. Soc.* 1877, pt. ii. 242) refers this species to *J. scandens,* which has the cymes much denser, the calyx-teeth divaricate, the corolla-tube shorter.

12. **J. bifarium,** *Wall. Cat.* 2866; leaves oblong acuminate minutely pubescent or glabrous, cymes subcapitate, calyx-teeth short linear erect pubescent, corolla-tube longer than its lobes. *DC. Prodr.* viii. 306. J. bracteatum, *Wall. Cat.* 2867. J. nummularoides, *Blume Mus. Lugd. Bat.* i. 275.

PENANG; *Wallich, Maingay.*—DISTRIB. Malaya to Borneo.

Scandent; branchlets hairy or nearly glabrous. *Leaves* 2 by $\frac{3}{4}$ in. (sometimes much larger), bifarious, base truncate; nerves 5 pairs, often pubescent, secondary obscure; petiole $\frac{1}{5}$ in. *Cymes* 6–12-flowered, usually subsessile between the two uppermost leaves; bracts $\frac{1}{8}$ in., linear; pedicels 0–$\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{16}$–$\frac{1}{10}$ in. *Corolla-tube* $\frac{3}{4}$ in.; lobes scarcely $\frac{1}{3}$ in., elliptic, acute. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

VAR. *glabra*; leaves larger elliptic rhomboid or rounded at the base glabrous often drying reddish not bifarious, calyx-teeth $\frac{1}{8}$–$\frac{1}{6}$ in. J. Lessertianum, *DC. Prodr.* viii. 304 *ex descr.*—Malacca and Singapore, frequent; *Wallich, Walker,* &c.—DISTRIB. Malaya.—This is one of Horsfield's plants, and believed to be J. glabrum, *Horsf.*; *Blume Bijd.* 679: but whether J. glabrum, *Willd.,* is doubtful.

13. **J. scandens,** *Vahl Symb.* iii. 2; leaves ovate-lanceolate glabrous or nearly so, cymes subcapitate pubescent, calyx-teeth short linear pubescent divaricate or recurved in flower, corolla-tube scarcely $\frac{1}{2}$ in. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 88; *Wall. Cat.* 2850; *DC. Prodr.* viii. 306; *Kurz For. Fl.* ii. 155, and *in Journ. As. Soc.* 1877, pt. ii. 242, *syn. excl.* J. lætum, *Wall. Cat.* 2859; *DC. l. c.* 306. Nyctanthes scandens, *Retz Obs.* v. 9.

BENGAL and PEGU, in the plains, common; and in the adjacent lower hills of SIKKIM, ASSAM, KHASIA, CACHAR and CHITTAGONG.

Scandent; branchlets pubescent. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acuminate, base rounded, pubescent on the nerves beneath or glabrous, coriaceous; nerves few, remote; petiole $\frac{1}{4}$ in. *Cymes* dense, often on short axillary branches; bracts $\frac{1}{6}$ in., linear, but the cyme frequently subsessile between the two uppermost leaves; pedicels 0–$\frac{1}{10}$ in. *Flowers* white, often tinged pink, very fragrant. *Calyx-teeth* $\frac{1}{16}$–$\frac{1}{8}$ in. *Corolla-tube* shorter than in the preceding species and somewhat broader; teeth $\frac{1}{4}$–$\frac{1}{3}$ in., oblong, acute. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

14. **J. decussatum,** *Wall. Cat.* 2860; leaves ovate-lanceolate hairy, flowers in clusters upon compound trichotomous villous cymes, calyx-teeth short linear recurved villous, corolla-tube about $\frac{1}{4}$ in. *DC. Prodr.* viii. 306; *Kurz For. Fl.* ii. 151, and *in Journ. As. Soc.* 1877, pt. ii. 241.

PEGU and TENASSERIM, frequent; *Wallich, Griffith,* &c.

Scandent; branchlets villous. *Leaves* 4 by $1\frac{3}{4}$ in., acuminate, base obtuse, mature hairy at least beneath, coriaceous; nerves few, remote; petiole $\frac{1}{4}$ in. *Cymes* terminal compound, and on short lateral branches; bracts $\frac{1}{5}$ in., linear; pedicels 0 or 0–$\frac{1}{5}$ in. *Calyx-teeth* $\frac{1}{10}$ in. *Corolla* smaller than in any of the preceding species; lobes $\frac{1}{4}$ in., narrowly lanceolate. *Carpel* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

†† *Calyx glabrous* (the series proceeds from the species with long to those with short calyx-teeth).

15. **J. cordifolium,** *Wall. Cat.* 2858; leaves cordate-lanceolate acuminate glabrous, cymes crowded many-flowered, calyx-teeth subulate, corolla-tube nearly 1 in. *G. Don Gen. Syst.* iv. 60; *DC. Prodr.* viii. 304. J. erectiflorum, *DC. Prodr.* viii. 308; *Wight Ic.* t. 1251.

NILGHERRIES; *Gardner, Wight*; Canoor, alt. 6000 ft., *Clarke.*

Scandent, glabrous. *Leaves* 4 by $1\frac{3}{4}$ in., coriaceous; nerves 7 pairs, the lowest divaricate, secondary obscure; petiole $\frac{1}{3}$–$\frac{3}{4}$ in. *Cymes* often 20-flowered, shortly repeatedly trichotomous; bracts $\frac{1}{5}$ in., linear; pedicels $\frac{1}{8}$ in. *Calyx-teeth* $\frac{1}{6}$–$\frac{1}{3}$ in. *Corolla-lobes* $\frac{3}{4}$ in., elliptic, acute. *Carpels* nearly $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid.—G. Don says the leaves are 3-nerved, the cymes pubescent, which will not apply to the present (nor to any Nilgherry) species; Wight has noted in his Herb. that *J. erectiflorum,* A. DC., is *J. cordifolium,* Wall.

16. **J. anastomosans,** *Wall. Cat.* 2863; leaves elliptic-lanceolate acuminate glabrous imperfectly 3-nerved, cymes 1–5-flowered axillary, calyx-teeth long linear, corolla-lobes very long narrow. *DC. Prodr.* viii. 305; *Kurz For. Fl.* ii. 152, and *in Journ. As. Soc.* 1877, pt. ii. 242. J. stenopetalum, *Lindl. in Bot. Reg.* t. 918, *in adnot.*; *DC. l. c.* 304; *Blume Mus. Bot.* i. 272. J. trinerve, *Roxb. Hort. Beng.* 3, and *Ic. Ined. in Herb. Kew.*, and *Fl. Ind. ed. Carey & Wall.* i. 91; *Wall. Cat.* 2848 A, *chiefly, not of Vahl.* J. laurifolium, *Wall. Cat.* 2847 A, *chiefly, not of Roxb.*—Jasminum sp. n. 32, *Herb. Ind. Or. H. f. & T.*

BHOTAN; Dalimkote, *Gamble.* KHASIA; *Griffith.* CACHAR; *Keenan.* SILHET; Chattuck, *H. f. & T.* PEGU; *Wallich,* &c., frequent.

Scandent, glabrous. *Leaves* 4 by $1\frac{1}{2}$ in., very acute, base obtuse sometimes cordate, membranous; lowest pair of nerves strong, carried along the margin, upper slender, distinct, resembling the secondary; petiole $\frac{1}{4}$ in. *Cymes* slender, on short lateral branches sometimes leafy, but more frequently altogether axillary; bracts $\frac{1}{4}$ in., linear; pedicels $\frac{1}{6}$ in. *Calyx-teeth* $\frac{1}{3}$–$\frac{3}{4}$ in. *Corolla-tube* $\frac{2}{3}$ in., lobes 7–10, often 1 in. *Carpels* $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid; calyx-teeth in fruit often thickened, divaricate, stellate.

VAR. *silhetensis,* Blume Mus. Bot. i. 271 (sp.); corolla-lobes a little shorter than the tube. J. trinerve, *Wall. Cat.* 2848, *chiefly.*—Silhet.—*J. trinerve,* Vahl, is defined as having the corolla-lobes only half as long as the tube; but, after all the labours of Blume, it may be a question whether the Indian plant is other than a form of it, as Roxburgh considered.

17. **J. subtriplinerve,** *Blume Mus. Bot.* i. 272; leaves elliptic-lanceolate acuminate glabrous 3-nerved, cymes 1–7-flowered axillary and terminal, calyx-teeth linear, corolla-lobes oblong acute shorter than the tube. J. trinerve, *Wall. Cat.* 2848, *partly.*

SIKKIM, ASSAM, KHASIA, SILHET, CACHAR, alt. 0–4000 ft., frequent; *Wallich, Griffith, H. f. & T.,* &c.

Closely allied to *J. anastomosans.* *Leaves* coriaceous, distinctly 3-nerved, the basal primary pair of nerves often carried near the margin nearly to the tip of the

leaf, other nerves obscure. *Flowers* usually 3, sometimes all solitary and terminal. sometimes in compound many-flowered cymes; pedicels not exceeding $\frac{1}{5}$ in., by which the species is known from all forms of *J. laurifolium*. *Calyx-teeth* $\frac{1}{4}$ in., shorter than in *J. anastomosans*, glabrous in the Sikkim examples, minutely scabrid-pubescent in the Khasian. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{2}{3}$ by $\frac{1}{4}$ in.

18. **J. nobile,** *Clarke*; leaves ovate-lanceolate acuminate, cymes few-flowered lax, corolla very large, calyx-teeth linear acute.—Jasminum, n. 26, *Herb. Ind. Or. H. f. & T.*

MOULMEIN; Thoungyeen, alt. 5000 ft., *Lobb*; Donnatoung, alt. 4000 ft., *Parish*.

Scandent, glabrous. *Leaves* $3\frac{1}{4}$ by $1\frac{1}{4}$ in., base obtuse or almost rounded, coriaceous, obscurely 3-nerved; petiole $\frac{1}{5}$ in. *Cymes* terminal and on shortened axillary branches, peduncled or sub-sessile, 3–5-flowered; bracts $\frac{1}{5}$ in., linear; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., thickened. *Calyx-teeth* $\frac{1}{4}$ in. *Corolla-tube* 1 in., lobes $1\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., oblong acute. *Fruit* not seen.

19. **J. laurifolium,** *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 91; leaves oblong or narrow-elliptic acuminate 3-nerved, cymes few-flowered lax, calyx-teeth linear long, corolla-lobes long narrow. *Wall. Cat.* 2847, *partly*; *DC. Prodr.* viii. 303; *Kurz For. Fl.* ii. 152, and *in Journ. As. Soc.* 1877, pt. ii. 241. J. angustifolium, *Ker in Bot. Reg.* t. 521, *not of Vahl.*

KHASIA MTS., *De Silva, H. f. & T.* (cultivated in Ceylon, Kumaon, Mauritius, &c.).

Scandent, glabrous. *Leaves* $2\frac{1}{2}$ by $\frac{3}{4}$ in., base obtuse or rounded, coriaceous, definitely 3-nerved in the cultivated examples, more membranous and anastomosing nerves more distinct in the native; petiole $\frac{1}{6}$ in. in the wild, $\frac{1}{4}$ in. in the cultivated plant. *Cymes* 3–5-flowered, terminal or long-peduncled and axillary; bracts $\frac{1}{5}$ in., linear; pedicels $\frac{1}{3}$–$\frac{3}{4}$ in., not much thickened. *Calyx-teeth* $\frac{1}{4}$ in. *Corolla-tube* $\frac{3}{4}$ in., lobes $\frac{3}{4}$ by $\frac{1}{8}$ in. *Fruit* not seen.—Ker, whose figure of this species is excellent, nevertheless says he could not distinguish it from *J. angustifolium* (by which Ker meant *J. sessiliflorum*); it has 3-nerved leaves, the corolla-lobes much longer.

VAR. *brachyloba*, Kurz l. c.; calyx-teeth $\frac{1}{10}$–$\frac{1}{6}$ in.—Birma; *Griffith* (Kew Distrib. n. 3712); Martaban and Tenasserim Hills, frequent (*Kurz*).

VAR. *sublinearis*; leaves 5 by $\frac{1}{2}$ in., calyx-teeth $\frac{1}{8}$ in.—Tavoy; *Helfer* (Kew Distrib. n. 3710).

20. **J. adenophyllum,** *Wall. Cat.* 2876; leaves elliptic-oblong acuminate penninerved, cymes lax few-flowered, calyx-teeth very long linear. *DC. Prodr.* viii. 314.

KHASIA MTS.; *De Silva.*

Scandent, glabrous. *Leaves* 5 by $1\frac{1}{4}$ in., base cuneate; primary nerves 8 pairs, subequally distant, the lowest short; petiole $\frac{1}{5}$ in., not (or very obscurely) jointed. *Peduncles* 1-flowered (in the scanty examples); bracts obsolete; pedicels 1 in. *Calyx-teeth* $\frac{1}{2}$ in., and upwards. *Corolla* and fruit not seen. The imperfect examples represent a species, apparently closely allied to *J. laurifolium*, but the nervation of the leaves is altogether different.

21. **J. sessiliflorum,** *Vahl Enum.* i. 29; leaves small ovate, cymes few-flowered, pedicels short, calyx-teeth linear long, corolla medium-sized tube hardly so long as the narrow lobes. *DC. Prodr.* viii. 307. J. angustifolium, *Wall. Cat.* 2873, *partly, not of Vahl.*

MADRAS; Nundidroog, Chingleput, *Rottler*, &c. CEYLON; *Thwaites.*

Scandent, ramous; branchlets often minutely pubescent. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in. (those of the shortened flowering lateral branchlets hardly half so large), shortly acute or subobtuse, base obtuse or almost rounded, glabrous; nerves few, obscure; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Cymes* usually 3- or 1-flowered, sessile; pedicels 0–$\frac{1}{6}$ in. *Calyx-teeth* $\frac{1}{4}$ in., glabrous or obscurely scabrid-pubescent. *Corolla-tube* $\frac{1}{3}$ in., lobes $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{10}$ in., acute. *Fruit* not seen.

22. **J. angustifolium,** *Vahl Enum.* i. 29; leaves small ovate, cymes few-flowered, pedicels long, calyx-teeth linear short, corolla largeish lobes lanceolate. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 95; *Wall. Cat.* 2873, *partly*; *Wight Ic.* t. 698; *DC. Prodr.* viii. 303. J. vimineum, *Willd. Sp. Pl.* i. 36. J. triflorum, *Pers. Syn.* i. 7. Nyctanthes angustifolia, *Linn. Sp. Pl.* 8. N. viminea, *Retz Obs.* v. 9. N. triflora, *Burm. Fl. Ind.* 4, t. 2. Mogorium vimineum, *Lamk. Dict.* iv. 213. M. triflorum, *Lamk. Ill.* 23, t. 6, fig. 2.—*Rheede, Hort. Mal.* vi. t. 53.

DECCAN PENINSULA and CEYLON; in the lower hills, frequent.

Scandent, ramous; branchlets minutely pubescent or almost villous. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in. (those of the lateral branchlets half as large), acute, base obtuse or almost rounded, glabrous; nerves few, obscure; petiole $\frac{1}{8}$ in. *Cymes* usually 3–1-flowered; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Calyx-teeth* $\frac{1}{8}$, rarely $\frac{1}{6}$ in., glabrous or very nearly so. *Corolla-tube* $\frac{1}{2}$–$\frac{3}{4}$ in.; lobes $\frac{2}{3}$ by $\frac{1}{8}$ in. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., unsymmetric, ellipsoid.—In the habit and leaves this species closely resembles *J. sessiliflorum*, with which it has been mixed from the days of Rottler.

23. **J. Ritchiei,** *Clarke*; leaves ovate or elliptic shortly acuminate glabrous, cymes few-flowered lax, pedicels long, calyx-teeth linear short, fruit-carpels large globose.

WESTERN GHATS and CEYLON, in the hills frequently collected; Nilgherries, *Wight, Gardner*; Bababoodun Hills, *Law*; Belgaum, *Ritchie*, &c.

Scandent, ramous, glabrous or nearly so. *Leaves* attaining $4\frac{1}{2}$ by $1\frac{3}{4}$ in., base broadly cuneate; nerves 5–6 pairs, prominent, often tufted in the axils; petiole $\frac{1}{6}$ in. *Cymes* very lax, often subpaniculate, 3–9-flowered; bracts $\frac{1}{5}$ in., linear; pedicels $\frac{1}{4}$–1 in. *Calyx-tube* campanulate, often somewhat ribbed; teeth $\frac{1}{8}$ in. and upwards, linear or shortly oblong, sometimes minutely ciliate-scabrid. *Corolla tube* $\frac{3}{4}$ in., lobes $\frac{3}{4}$ in., narrow. *Carpels* $\frac{1}{3}$ in., very accurately spherical.—Named *J. angustifolium* by Wight and Ritchie, from which in flower it does not differ much but by the larger leaves; the fruits are unusual.

VAR. *purpurea*, Heyne in Herb. Rottler (sp.); leaves more obtuse sometimes roundish.—Bababoodun Hills, *Rottler*. Ceylon, *Wight*.

24. **J. Wightii,** *Clarke*; glabrous, leaves oblong-lanceolate long-acuminate, cymes trichotomously compound lax, calyx-teeth shortly linear, corolla-tube $\frac{1}{2}$ in. lobes $\frac{3}{4}$ in.

Bolimputty near COIMBATORE; *Wight*, n. 1762.

Branches flexuose. *Leaves* $3\frac{1}{2}$ by $\frac{3}{4}$ in., or some more ovate, attenuate into the petiole, penninerved; nerves obscure; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* terminal; bracts $\frac{1}{6}$ in., linear; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. *Calyx-teeth* $\frac{1}{8}$ in. *Corolla-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in. wide, acute. *Fruit* not seen.—The leaves are punctate beneath, the cyme somewhat divaricated, the calyx-teeth separated by a very wide sinus. It may be allied to *J. arborescens* var. *montana*, but it is very glabrous.

25. **J. rigidum,** *Zenker Pl. Ind.* 5, t. 6; glabrous, leaves ovate or elliptic shining, cymes few-flowered dense sessile, calyx-teeth linear rigid erect, corolla-tube elongate longer than the lobes. *DC. Prodr.* viii. 305; *Wight Ic.* t. 1247; *Thwaites Enum.* 190, *in part*. J. myrtophyllum, *Zenker Pl. Ind.* 6, t. 7; *DC. l. c.* 304. J. ligustrifolium, *Wall.*; *Bojer Hort. Maurit.* 204; *DC. l. c.* 305, *not of Lamk.* J. cuspidatum, *Rottler*; *Spreng. Syst.* i. 30; *Wall. Cat.* 2872. J. Perrottetianum, *DC. l. c.* 304, *ex descr.* J. triflorum, *Heyne in Herb. Rottler, not of Pers.*

DECCAN PENINSULA and CEYLON, alt. 0–5000 ft.; common.

A rigid, dense, shrub, hardly scandent. *Leaves* 2 by $\frac{3}{4}$ in., upper acute at both ends, not acuminate, lower ovate, coriaceous; nerves reticulating, slender but often subprominent on the upper surface; petiole $\frac{1}{6}$ in. *Cymes* 3–1-flowered; pedicels 0–$\frac{1}{8}$

in. *Calyx-teeth* $\frac{1}{6}$ in. *Corolla-tube* 1 in.; lobes $\frac{2}{3}$ by $\frac{1}{6}$ in., oblong, acute. *Fruit* not seen.

VAR. *tetraphis*, Wight & Gardn. in Calc. Journ. Nat. Hist. vi. 55 (sp.); subscandent, leaves larger, cymes with more flowers.—Nilgherries; *Gardner*, &c.—Leaves puberulo-punctate beneath. May this be J. Perottetianum, *A. DC. Prodr.* viii. 304?

26. **J. trichotomum,** *Heyne*; *Roth. Nov. Sp.* 6; leaves ovate-lanceolate glabrous or minutely rusty-pubescent beneath, cymes trichotomous compound lax glabrous or nearly so, calyx-teeth minute triangular-subulate, corolla smallish. *Wall. Cat.* 2879; *DC. Prodr.* viii. 308. J. intermedium *and* J. Gardnerianum, *Wight in Herb.*

MADRAS; Rayacottah, *Heyne*; Nilgherries, *Gardner*, *Wight.*

Scandent, ramous; branchlets glabrous. *Leaves* $2\frac{1}{4}$ by 1 in., not acuminate, base broadly cuneate or almost rounded; nerves 7 pairs, secondary obscure; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cymes* terminal, often paniculate, divaricate; bracts $\frac{1}{20}$ in., lanceolate; pedicels $\frac{1}{8}$–$\frac{1}{2}$ in. *Calyx* glabrous, teeth in Heyne's type example 0–$\frac{1}{25}$ in., rarely attaining $\frac{1}{15}$ in. *Corolla-tube* $\frac{1}{4}$ in.; lobes $\frac{1}{3}$ in., narrow acute. *Carpels* $\frac{1}{4}$ in., ellipsoid, black. —Allied to *J. arborescens* (var. *montana*), as noted by Heyne on the original plant of Rottler. Roth's description does not agree well with this type, and has puzzled all authors.

27. **J. latipetalum,** *Clarke*; glabrous, leaves narrow-lanceolate coriaceous, cymes few-flowered lax, calyx-teeth minute lanceolate, corolla large lobes $\frac{1}{3}$–$\frac{1}{2}$ in. broad.

MOULMEIN; Thoung-gyeen, alt. 5000 ft., *Lobb.*

Scandent. *Leaves* 5 by $\frac{3}{4}$ in., elongate, acuminate, base obtuse, almost rounded, very thick; nerves 20 pairs, horizontal, obscure; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., not (or very obscurely) jointed. *Cymes* 1–5-flowered, terminal; bracts $\frac{1}{8}$ in., lanceolate; pedicels $\frac{1}{3}$ in. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla-tube* 1–$1\frac{1}{4}$ in., slender; lobes $\frac{3}{4}$ in., obovate-oblong, obtuse. *Fruit* not seen.

28. **J. attenuatum,** *Roxb. Hort. Beng.* 3; glabrous, leaves oblong acuminate, cymes lax slender, calyx subhemispheric teeth minute, corolla-tube $\frac{2}{3}$–$\frac{3}{4}$ in. *Wall. Cat.* 2864; *DC. Prodr.* viii. 309; *Kurz For. Fl.* ii. 151, and *in Journ. As. Soc.* 1877, pt. ii. 241.

KHASIA MTS. and adjacent part of ASSAM, alt. 500–4000 ft., frequent; *Wallich, Griffith, H. f. & T.*, &c. MARTABAN, alt. 5–7000 ft. (*Kurz*).

Scandent. *Leaves* $6\frac{1}{4}$ by 2 in., base cuneate or subobtuse, membranous; nerves 12 pairs, obscure; petiole $\frac{1}{2}$ in. *Cymes* axillary and terminal, slender; bracts $\frac{1}{8}$ in., lanceolate; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender. *Calyx-teeth* $\frac{1}{20}$ in. *Corolla* bright-red, pink or white; lobes $\frac{1}{2}$ in., lanceolate, acute. *Fruit-carpels* $\frac{1}{2}$ by $\frac{1}{3}$ in., ellipsoid.

29. **J. glandulosum,** *Wall. Cat.* 2849; glabrous, leaves elliptic acuminate, cymes slender lax few-flowered, calyx-tube cylindric-campanulate teeth minute, corolla-tube 1–$1\frac{1}{4}$ in. slender lobes $\frac{3}{4}$–1 in. linear. *DC. Prodr.* viii. 304; *Royle Ill.* 268; *Brand For. Fl.* 312. J. nepalense, *Spreng. cura post.* 12; *DC. l. c.* 308. J. dichotomum, *Don Prodr.* 105, *not of Vahl.* J. Hamiltonii, *G. Don Gen. Syst.* iv. 67. J. laurifolium, *Gamble Darjeeling List*, 55, *not of Roxb.*

SUBTROPICAL HIMALAYA, alt. 2–6000 ft., from Kumaon to Bhotan; frequent. KHASIA MTS., alt. 2–4000 ft., frequent.

Scandent. *Leaves* 3 by $1\frac{1}{2}$ in., base obtuse or rounded; nerves 7 pairs, distinct, often tufted in the axils beneath, inarching; petiole $\frac{1}{5}$ in. *Cymes* axillary and terminal, 1–3-flowered; bracts $\frac{1}{10}$ in., linear; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender. *Calyx-tube* $\frac{1}{5}$ by $\frac{1}{10}$ in., lobes $\frac{1}{20}$ in. *Corolla* white, scarcely yellow while fading; lobes $\frac{1}{12}$–$\frac{1}{8}$ in. broad. *Carpels* $\frac{3}{4}$ by $\frac{1}{3}$ in., elongate ellipsoid.—This has been confounded with the Australian *J. simplicifolium* (Benth. Fl. Austral. iv. 296), which has a much shorter calyx-tube.

a less slender corolla, and fruit carpels not half as long; and is only known in cultivation in India.

30. **J. subglandulosum,** *Kurz in Trimen Journ. Bot.* 1875, p. 329, and *For. Fl.* ii. 151; glabrous, leaves large obovate-oblong shortly acuminate, racemes axillary very lax, calyx broad teeth very short, corolla-tube ½–⅔ in., lobes half as long obovate-oblong blunt.

SOUTH ANDAMAN; *Kurz.* PEGU and TENASSERIM, in the tropical forests not infrequent (*Kurz*).

Scandent. *Leaves* 7 by 2¾ in., base obtusely cuneate, membranous; nerves 10 pairs, secondary distinct. *Flowers* white; bracts minute, subulate. *Carpels* ½ by ⅓ in., ellipsoid.—Description chiefly from Kurz, as his example is very imperfect: the inflorescence appears strictly cymose, as in the two preceding species; there is nothing in the material or description to show that it differs from *J. attenuatum* but in the somewhat larger leaves.

31. **J. smilacifolium,** *Griff. ms.*; glabrous, leaves large ovate acute coriaceous 3-nerved, cymes axillary and terminal stout compound, calyx-teeth short thick triangular, flowers and fruits large.

MALACCA; *Griffith* (Kew Distrib. n. 3698), *Maingay.*

A large climber. *Leaves* 7 by 3¾ in., base obtuse or almost cordate, very thick, secondary nerves thin distinct; petiole ¾ in. *Cymes* 5–20-flowered, not lax; bracts $\frac{1}{10}$ in., lanceolate; pedicels ⅛–¼ in. *Calyx-teeth* $\frac{1}{16}$ in. *Corolla* white tinged with pink, tube ¾–1 in., lobes ¾ by ⅕ in., acute. *Carpels* 1 by ½–⅔ in.; pedicels often greatly enlarged, ⅙ in. diam. below the fruit.—This has been supposed a var. merely of *J. crassifolium,* Blume, which however has smaller obscurely 3-nerved leaves, and the cymes much slenderer, with pedicels often ¾ in.

** Leaves (some of them) compound: in *J. auriculatum* and *brevilobum* often in appearance simple, the lateral leaflets being only occasionally present and then exceedingly small. (The series proceeds from the less- to the more-compound-leaved species.)

32. **J. auriculatum,** *Vahl Symb.* iii. 1; leaves mostly simple ovate some 3-foliolate the lateral leaflets mere auricles, cymes compound many-flowered, corolla-tube ¼–½ in. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 96; *Wall. Cat.* 2854; *Bot. Reg.* t. 264; *DC. Prodr.* viii. 309, *syn. excl.*; *Wight Ic.* t. 700. J. affine *and* ovalifolium, *Wight Ic.* tt. 1255, 1256.

DECCAN PENINSULA and CEYLON, common (cultivated in Scinde, North-west India, Bengal, Siam and Mauritius).

Scandent; pubescent or villous, sometimes nearly glabrous. *Leaves* (when simple and the terminal leaflets) 1 by ¾ in., shortly acute or hardly acuminate, base obtuse or rounded, ashy-pubescent sometimes glabrescent; nerves few, lowest oblique; lateral leaflets when present rarely exceeding ⅙ in. diam. *Cymes* terminal, paniculate, grey-pubescent; bracts ⅙ in., linear; pedicels 0–⅙ in. *Calyx-teeth* minute, narrowly oblong. *Corolla-lobes* ¼ in., elliptic. *Carpels* ⅕ in. diam., globose, black. The *J. mauritianum,* Bojer, reduced to *J. auriculatum* by Baker (Fl. Maurit. 220) has the leaves subequally 3-foliolate, the corolla-tube nearly 1 in. *J. affine,* Wight, with the style half as long as corolla-tube, and *J. ovatifolium,* Wight, with the stigmas exserted, are dimorphic forms.

33. **J. brevilobum,** *A. DC. Prodr.* viii. 307; leaves mostly simple ovate, some 3-foliolate the lateral leaflets mere auricles, cymes sessile subcapitate, corolla-tube ⅔–1 in. J. nilagiricum, *Pl. Hohenack.* n. 1007.

MTS. of the DECCAN PENINSULA; Nilgherries, Pulneys, &c., alt. 3–6000 ft., frequent; *Gardner, Wight,* &c.

Resembling *J. auriculatum*; usually villous or subtomentose, sometimes only

sparingly pubescent. Terminal *leaflets* often cordate; the lowest primary nerves divaricate. *Cymes* terminal, 3–10-flowered, dense. *Flowers* altogether larger than in *J. auriculatum*; lobes often $\frac{1}{3}$ by $\frac{1}{6}$ in. *Carpels* larger, $\frac{1}{4}$ in. diam. and upwards.

34. **J. flexile,** *Vahl Symb.* iii. 1; glabrous, leaves opposite nearly all 3-foliolate, leaflets elliptic or ovate acute coriaceous distinctly nerved, cymes lax axillary and terminal upper elongate paniculate longer than the leaves, corolla-tube $\frac{2}{3}$–1 in. *Wall. Cat.* 2881; *DC. Prodr.* viii. 310; *Wight Ic.* t. 1253.—*Burm. Thes. Zeyl.* t. 58, fig. 1.

DECCAN PENINSULA and CEYLON, in the lower hills, frequent.

Scandent. Terminal *leaflet* $4\frac{1}{2}$ by $1\frac{1}{2}$–2 in., base rounded or obtuse; primary nerves 6 pairs, inarching. *Panicles* 4–8 in. long, or the lower short few-flowered, branches opposite alternate or whorled; bracts $\frac{1}{6}$ in., linear; pedicels $\frac{1}{8}$–$\frac{1}{2}$ in. *Calyx-teeth* minute. *Corolla* white, lobes $\frac{1}{2}$ by $\frac{1}{5}$ in., acute or obtuse. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.—Heyne named three examples of this in Herb. Rottler: *J. acuminatum*, *J. azoricum* and *J. travancorense.* The Timor *J. parviflorum*, Decne., is said to have much smaller flowers, but it must be very nearly allied.

VAR. *ovata*, Wall. Cat. 2882 (sp.), chiefly; leaflets obtusely cuneate at the base, axillary cymes short few-flowered, pedicels $\frac{1}{8}$ in. J. attenuatum, *Wall. Cat.* 2864, B, *not of Roxb.*—Khasia; *Wallich.*—This is possibly a var. of *J. lanceolaria*, Roxb.; it has leaves distinctly nerved, the flowers rather smaller.

VAR. *Hookeriana*; terminal leaflet 4 by $2\frac{1}{3}$ in. membranous, corolla large with broad lobes.—Jasminum n. 41, *Herb. Ind. Or. H. f. & T.*—Khasia; *Hook. f. & T.*—This seems exactly half-way between *J. flexile* and *J. caudatum*, having the broad leaflets of the former, the membranous texture and flowers of the latter.

35. **J. caudatum,** *Wall. Cat.* 2884; glabrous, leaves opposite nearly all 3-foliolate, leaflets lanceolate or ovate-lanceolate caudate-acuminate membranous distinctly nerved, cymes lax, corolla-tube $\frac{3}{4}$–$1\frac{1}{4}$ in. *Lindl. in Bot. Reg.* 1842, t. 26; *DC. Prodr.* viii. 310. J. ovatum, *Wall. Cat.* 2882, *in part.*

KHASIA, alt. 0–4000 ft., frequent; *Wallich, H. f. & T.*, &c. MISHMEE; *Griffith.*

Only distinguishable from *J. flexile*, var. *Hookeriana*, by the narrower more caudate leaves. The cyme is usually slenderer, the corolla longer, the tube attaining $1\frac{1}{4}$ in., the lobes $\frac{3}{4}$ by $\frac{1}{3}$ in.

36. **J. lanceolaria,** *Roxb. Fl. Ind. ed. Carey & Wall.* i. 97; glabrous, leaves opposite nearly all trifoliolate, leaflets elliptic shortly acuminate very thick, nerves obscure, cymes compound rigid thick-branched, corolla-tube 1 in. *DC. Prodr.* viii. 310. J. lanceifolium, *Roxb. Hort. Beng.* 3?.

KHASIA and JAINTEA MTS., alt. 3–5000 ft., frequent; *Griffith, H. f. & T.*, &c.

A large climber. *Leaflets* 4 by $1\frac{1}{2}$ in., acute, base obtusely cuneate. *Cymes* compound, trichotomous; bracts $\frac{1}{5}$ in., linear; pedicels 0–$\frac{1}{2}$ in., thick, still thicker in fruit. *Calyx-teeth* minute. *Corolla* large, white; lobes attaining $\frac{3}{4}$ by $\frac{1}{3}$ in. *Carpels* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., subglobose.—Easily recognised by the very thick leaflets and stout cymes. This has been identified by Benth. (*Fl. Hongk.* 216) with *J. paniculatum*, Roxb., a Chinese plant, which has the corolla far smaller (tube $\frac{1}{2}$ in., lobes $\frac{1}{4}$ in.), the cyme less stout, the leaflets obtuse.

37. **J. heterophyllum,** *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 99; leaves alternate simple and 3-foliolate, leaflets ovate-lanceolate glabrous, cymes very compound minutely pilose, corolla yellow tube $\frac{1}{4}$–$\frac{1}{3}$ in. *Wall. Cat.* 2883; *Don Prodr.* 106; *Wall. Pl. As. Rar.* iii. 47, t. 275; *DC. Prodr.* viii. 312; *Loud. Arb.* 655, t. 1274.

NIPAL; *Wallich, Scully.* MISHMEE; *Griffith.*

Scandent. *Leaves* 5 by $2\frac{1}{4}$ in. (lateral leaflets, when present, smaller), base rounded or cordate, somewhat coriaceous, nerves irregular but distinct beneath. *Cymes* mostly terminal, 10–90-flowered, branches alternate; bracts $\frac{1}{8}$ in., linear; pedicels 0–$\frac{1}{3}$ in.

Calyx small, minutely pubescent, teeth minute. *Corolla-lobes* $\frac{1}{4}$ in., elliptic, acute. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

38. **J. calophyllum,** *Wall. Cat.* 2889; leaves opposite and alternate subequally 3-foliolate, leaflets broadly ovate glabrous, cymes compound trichotomous minutely pubescent, corolla-tube $\frac{3}{4}$ in. *DC. Prodr.* viii. 310; J. courtallense, *Wight Ic.* t. 1252.

SOUTH DECCAN PENINSULA; Nilgherries, *Wight, Foulkes*; Courtallum, *Wight.*

Scandent. *Leaflets* 2 by $1\frac{1}{2}$ in., obtuse or shortly acute, base rounded truncate or subcordate, membranous, shining, nerves slender. *Cymes* 10–50-flowered, branches alternate and opposite; bracts minute; pedicels 0–$\frac{1}{6}$ in. *Calyx* nearly glabrous, subtruncate. *Corolla-lobes* $\frac{1}{4}$–$\frac{1}{2}$ in., elliptic, obtuse. *Carpels* $\frac{1}{5}$ in., ellipsoid.

39. **J. dispermum,** *Wall. Cat.* 2886, and *in Roxb. Fl. Ind. ed. Carey & Wall.* i. 99, and *Pl. As. Rar.* iii. 46, t. 274; leaves opposite 3–5-foliolate, leaflets cordate-lanceolate glabrous sub-3-nerved, cymes somewhat dense puberulous or pubescent running into terminal panicles, corolla-tube $\frac{1}{2}$ in. *Don Prodr.* 106; *DC. Prodr.* viii. 310; *Brand. For. Fl.* 312.

TEMPERATE HIMALAYA; alt. 2–8000 ft., from Kashmir to Bhotan, common. KHASIA MTS., alt. 3–6500 ft., common.

Scandent. Terminal *leaflet* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., acuminate, coriaceous; lateral leaflets 1 or often 2 pairs, smaller. *Cymes* when axillary 10–20-flowered; upper leaves often gradually reduced to bracts $\frac{1}{5}$ in. long, whence arises a terminal elongate panicle 60–100-flowered; proper bracts $\frac{1}{10}$ in.; pedicels 0–$\frac{1}{5}$ in. *Calyx* glabrous or minutely puberulous, teeth $\frac{1}{25}$ in., short-triangular. *Corolla* white; lobes $\frac{1}{4}$–$\frac{1}{3}$ in., broadly elliptic. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

40. **J. humile,** *Linn.*; *DC. Prodr.* viii. 313: glabrous or puberulous, leaves alternate 3-foliolate or pinnate, leaflets rhomboid oblong coriaceous, cymes somewhat dense, calyx-teeth very short, corolla yellow tube $\frac{1}{2}$–$\frac{2}{3}$ in. *Bot. Reg.* t. 350. J. chrysanthemum, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 98. J. revolutum, *Sims in Bot. Mag.* t. 1731; *Bot. Reg.* t. 178; *Don Prodr.* 106; *Wall. Cat.* 2887; *Lodd. Bot. Cab.* t. 966; *DC. l. c.* 312; *Wight Ic.* t. 1258; *Loud. Arb.* 655, t. 1275; *Brand. For. Fl.* 313; *Boiss. Fl. Orient.* iv. 42. J. bignoniaceum, *Wall. Cat.* 2888; *DC. l. c.* 313. J. Wallichianum, *Lindl. in Bot. Reg.* t. 1409. J. inodorum, *Jacquem.*; *Dcne. in Jacq. Voy. Bot.* 139, t. 143; *DC. l. c.* 312.—Jasminum, n. 3, *Hardwicke in As. Research.* vi. 349.

SUBTROPICAL HIMALAYA, alt. 2–5000 ft., from Kashmir to Nipal, common. BHOTAN; *Griffith.* SOUTH INDIA and CEYLON, alt. 2–6000 ft., common.—DISTRIB. Cabul (cultivated widely).

An erect rigid, ramous shrub. *Leaflets* 2 by $\frac{3}{4}$–1 in., or $\frac{1}{2}$ by $\frac{1}{4}$ in., very variable in size, usually smaller when more numerous, acute or obtuse at both ends; nerves inconspicuous. *Cymes* 10–20-flowered; bracts minute; pedicels $\frac{1}{8}$–$\frac{3}{4}$ in. *Calyx* glabrous or nearly so; teeth $\frac{1}{16}$ in., triangular-oblong. *Corolla-lobes* $\frac{1}{3}$ by $\frac{1}{5}$ in. *Carpels* $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid.

41. **J. pubigerum,** *Don Prodr.* 106; softly densely villous, leaves alternate 3–7-foliolate, leaflets ovate or oblong, cymes dense, calyx-teeth $\frac{1}{20}$–$\frac{1}{10}$ in. densely villous, corolla-tube $\frac{2}{3}$ in. *DC. Prodr.* viii. 312, *excl. var.* β.

NORTH-WEST INDIA; *Royle.*

An erect shrub, in habit closely resembling *J. humile* and perhaps a var. thereof, but there are no examples intermediate in hairiness. *Branches* dense, villous. *Leaflets* $1\frac{1}{2}$–2 in., from suborbicular to oblong, closely villous on both surfaces. *Cyme* nearly sessile, 15-flowered, very villous. *Calyx-teeth* linear, short but much longer than in *J. humile.*—Perhaps a garden plant.

42. **J. officinale,** *Linn.*; *DC. Prodr.* viii. 313; glabrous or nearly so, leaves opposite pinnate, leaflets rhomboid oblong acute, calyx-teeth linear long, corolla white tube ⅔ in. *Bot. Mag.* t. 31; *Brand. For. Fl.* 313; *Boiss. Fl. Orient.* iv. 43.

KASHMIR; alt. 3–9000 ft., frequent.—DISTRIB. Cabul, Persia (often cultivated in India, China, Europe, &c.).

Branches very long, weak, requiring support, hardly scandent. *Cymes* terminal, 1-10-flowered, often leafy; bracts ⅓ in., linear; pedicels 0–¾ in. *Calyx-teeth* ¼–⅔ in., sometimes as long as the corolla-tube, sometimes (in the same plant) not half so long. *Corolla-lobes* ⅓ by ¼ in. *Carpels* ⅓ by ¼ in., ellipsoid.

43. **J. grandiflorum,** *Linn.*; *DC. Prodr.* viii. 313; glabrous or nearly so, leaves opposite pinnate, leaflets rhomboid-oblong, calyx-teeth linear long, corolla white tube ¾ in. *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 98; *Bot. Reg.* t. 91; *Wall. Cat.* 2885; *Wight Ic.* t. 1257; *Brand. For. Fl.* 313; *Kurz For. Fl.* ii. 150, and *in Journ. As. Soc.* 1877, pt. ii. 242. J. aureum, *Don Prodr.* 106; *DC. l. c.* 314?.—*Rheede Hort. Mal.* vi. t. 52.

SUBTROPICAL NORTH-WEST HIMALAYA, alt. 2–5000 ft.; frequent, wild (fide *Brandis*; elsewhere in India often cultivated).

Branches subpendent, angular, hardly requiring support. *Calyx-teeth* about ¼ in., rarely half as long as the corolla-tube. *Corolla-lobes* attaining ½ in.—Otherwise hardly distinguishable from *J. officinale.*

EXCLUDED SPECIES (not British Indian).

J. EXTENSUM, *Wall. Cat.* 2862; *DC. Prodr.* viii. 308; *Kurz For. Fl.* ii. 150.—Birma.

J. LIGUSTRIFOLIUM, *Wall. ms.*; *Bojer Hort. Maurit.* 204, *DC. Prodr.* viii. 305.—Birma, beyond the British frontier.

J. TUBIFLORUM, *Roxb. Cat. Pl.* (1813), *Fl. Ind. ed. Carey & Wall.* i. 96.—This is supposed to be the origin of J. SOLENANTHUM, *DC. Prodr.* viii. 306, founded on a specimen cultivated in the Mauritius. Malay Islds.

J. OBLONGUM, *Burm. Fl. Ind.* 6, t. 3, fig. 2; *DC. Prodr.* viii. 312.—Java.

2. **NYCTANTHES,** *Linn. in part.*

A small tree. *Leaves* opposite, ovate. *Flowers* in small, sessile, bracteate heads disposed in terminal trichotomous cymes. *Calyx* ovoid-cylindric, subtruncate, finally split or deciduous. *Corolla* salvershaped; tube cylindric, yellow; lobes 4–8, imbricated in bud, patent, white. *Anthers* 2, subsessile near the top of the corolla-tube. *Ovary* 2-celled; style cylindric, very shortly bifid; ovule 1 in each cell, erect, basal. *Capsule* orbicular, compressed parallel to the partition, ripe separating into 2 subdiscoid carpels. *Seed* erect, orbicular, flattened, testa thin, albumen 0; cotyledons flat, radicle inferior.

N. Arbor-tristis, *Linn.*; *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 85; *Wall. Cat.* 2846; *Bot. Reg.* t. 399; *Lamk. Ill.* t. 6; *DC. Prodr.* viii. 314; *Bot. Mag.* t. 4900; *Bedd. Fl. Sylv.* t. 240; *Eichler in Mart. Bras.* vi. pt. i. 317, t. 84, fig. 3; *Brand. For. Fl.* 314; *Kurz For. Fl.* ii. 155, and *in Journ. As. Soc.* 1877, pt. ii. 240. Parilium Arbor-tristis, *Gaertn. Fruct.* i. 234, t. 51. Scabrita scabra, *Linn.*; *Vahl Symb.* ii. 28; *Gaertn. Fruct.* ii. 265, t. 138. S. triflora, *Linn. Mant.* i. 37.—*Rheede Hort. Mal.* i. t. 21 Sephalica, *Jones in As. Research.* iv. 244.

CENTRAL INDIA, alt. 1–3000 ft., common, to Bundelkund and Burdwan; reappearing in the Oudh and North-west Terai (cultivated throughout India, and in both hemispheres).

Erect, 30 ft., but often forming coppice, scabrid-pilose. *Leaves* 4¼ by 2½ in., acute, base rounded or cuneate; petiole ⅓ in., not articulated. *Flowers* 3–7 in each head, sweet-scented; bracts ¼–½ in., elliptic. *Calyx* ⅕ in. *Corolla-tube* ¼–⅓ in.; lobes ⅕–¼ in., elliptic. *Capsule* ¾ in. long and broad by ⅛–⅙ in. thick.

3. SCHREBERA, *Roxb.*

A tree. *Leaves* opposite, unequally pinnate. *Flowers* in terminal 2–3-chotomous compound cymes; bracts small. *Calyx* tubular-campanulate, irregularly 4–7-lobed. *Corolla* salvershaped; tube cylindric; lobes imbricate in the bud, 4–7, patent. *Stamens* 2, near the top of the corolla-tube; filaments short. *Ovary* 2-celled; style cylindric, shortly 2-lobed; ovules 3–4 in each cell, pendulous from its apex. *Capsule* obovoid, 2-celled, loculicidally 2-valved, woody. *Seeds* pendulous, winged, albumen 0; cotyledons plano-convex or contorted, radicle superior.—DISTRIB. Species 4; 1 Indian, 3 African.

S. swietenioides, *Roxb. Cor. Pl.* ii. t. 101, and *Fl. Ind. ed. Carey & Wall.* i. 109; minutely pubescent or glabrous, leaves 5–7-foliolate, cymes many-flowered, capsule 2 in. pearshaped. *Wight Ill.* t. 162; *Trattin. Arch.* i. 29, *with plate*; *DC. Prodr.* viii. 675; *Bedd. Fl. Sylv.* t. 248; *Brand. For. Fl.* 305; *Kurz For. Fl.* ii. 156, and *in Journ. As. Soc.* 1877, pt. ii. 243.

TROPICAL HIMALAYA; Kumaon Terai. DECCAN PENINSULA, alt. 1–4000 ft. PEGU; widely diffused, but not abundant.

A tree, 40–50 ft. *Leaflets* 4 by 2 in., ovate, acute, mature glabrous; petiolules ⅓ in. *Cyme* often 100-flowered; bracts ⅕ in., linear, or obsolete; pedicels 0–⅓ in. *Calyx* ⅙ in., irregularly 5-lobed, somewhat 2-lipped or subtruncate, minutely pilose or glabrescent. *Corolla* white with brown marks; tube ¼–⅓ in.; lobes ⅕–¼ in., elliptic. *Anthers* subexserted. *Capsule* 2 by 1½ in., obovoid, obtuse, very woody. *Seeds* usually 3–4 in each cell; cotyledons contorted.

VAR. *pubescens*, Kurz in Flora, 1872, p. 398 (sp.); leaves pubescent, cyme villous.—Jubbulpore; *Kurz.*—A variety of *S. swietenioides* according to Kurz himself in *Journ. As. Soc.* 1877, pt. ii. 243, who says that the capsules are much smaller.

4. SYRINGA, *Linn.*

Shrubs. *Leaves* opposite, simple or (in cultivation) pinnate. *Panicles* terminal; bracts small or 0. *Calyx* small, campanulate, irregularly toothed or subtruncate, persistent. *Corolla* salvershaped; tube narrow-cylindric; lobes 4, patent, elliptic, induplicate-valvate in bud. *Stamens* 2, near the top of the corolla-tube; filaments short; anthers oblong, laterally dehiscent. *Ovary* 2-celled; style cylindric, included, 2-partite or subsimple; ovules 2 in each cell, pendulous from its apex. *Capsule* oblong, subterete, loculicidally 2-valved. *Seeds* pendulous, compressed, winged, albuminous; cotyledons flat, radicle superior.—DISTRIB. Species 6 (or 11 ex Dcne.), from Eastern Europe to Japan.

1. **S. persica,** *Linn.*; *DC. Prodr.* viii. 283; leaves 1 in. ovate-lanceolate or lanceolate glabrous, flowers numerous scarcely fascicled. *Bot. Mag.* t. 486; *Wall. Cat.* 2832; *Brand. For. Fl.* 306; *Rev. Hort.* 1878, p. 571–2, *with fig.*; *Dcne. in Nouv. Arch. Mus.* 2, ii. 42; *Boiss. Fl. Orient.* iv. 38.

WEST KASHMIR; alt. 8000 ft., possibly wild; frequently cultivated in India.—DISTRIB. Persia.

A glabrous shrub. *Leaves* acute, rarely obtuse, sometimes pinnatifid or subpinnate, base cuneate; petiole ¼ in. *Panicles* compound, glabrous; bracts from ½ in. lanceolate to ⅛ in. linear, usually inconspicuous; pedicels $\frac{1}{12}$–⅕ in. *Calyx* ⅛ in., teeth short, triangular. *Corolla* lilac or white; tube ¼ in., lobes ⅕ in. *Capsule* ⅓–½ by ⅛ in., terete, 4-ribbed.—*Persian Lilac.*

2. **S. Emodi,** *Wall. Cat.* 2831; leaves 2-5 in. elliptic or ovate glabrous whitened beneath, panicles dense, flowers often fascicled. *Royle Ill.* 267, t. 65, fig. 2; *DC. Prodr.* viii. 283; *Bot. Reg.* 31 (1845), t. 6; *Brand. For. Fl.* 306; *Decne. in Nouv. Arch. Mus.* 2, ii. 40.

SUBALPINE HIMALAYA, alt. 9–12,000 ft., from Kashmir to Kumaon, frequent; *Wallich, Falconer*, &c.

A large shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{3}{4}$ in., acute at both ends, secondary nerves prominently reticulating beneath; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Panicles* dense-flowered; bracts lanceolate, deciduous, usually inconspicuous; pedicels often 0, sometimes $\frac{1}{8}$ in. *Calyx* $\frac{1}{8}$ in., subtruncate, minutely pubescent or nearly glabrous. *Corolla* purplish or white; tube $\frac{1}{4}$ in.; lobes $\frac{1}{5}$ in. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in., terete, 2-grooved, acute.

5. FRAXINUS, *Linn.*

Trees. *Leaves* opposite, unequally pinnate. *Inflorescence* terminal or on shortened axillary buds falsely axillary. *Flowers* small, polygamous or diœcious, panicled, racemose or subfascicled; bracts caducous. *Calyx* small, 4-toothed, or 0. *Petals* 0, or 2–4, free or connate in pairs at the base, narrow-oblong, induplicate-valvate in bud. *Stamens* 2, attached near the base of the petals or subhypogynous, filaments short or long. *Ovary* 2-celled; style short or long, bifid; ovules in each cell 2, pendulous from its apex. *Capsule* samaroid, compressed contrary to the partition, produced into a wing, 1-seeded, indehiscent. *Seed* pendulous, oblong; albumen fleshy; cotyledons flat, radicle superior.—DISTRIB. Species 30, in the north temperate regions of both hemispheres.

SECT. I. **Ornus.** *Petals* 2–4. *Flowers* panicled, mostly hermaphrodite.

1. **F. floribunda,** *Wall. Cat.* 2836, and *in Roxb. Fl. Ind. ed. Carey & Wall.* i. 150, and *Pl. As. Rar.* iii. 47, t. 277; leaflets elliptic-lanceolate serrate membranous, secondary nerves reticulated, samaras 1–$1\frac{1}{2}$ in. very narrow obtuse or emarginate. *Don Prodr.* 106; *DC. Prodr.* viii. 275; *Brand. For. Fl.* 302, t. 37. F. urophylla, *Wall. Cat.* 2835; *DC. l. c.* Ornus floribunda, *Dietr. Sp. Pl.* i. 249; *Loud. Arb.* 653, t. 1270. O. urophylla, *G. Don Gen. Syst.* iv. 57.

TEMPERATE and SUBALPINE HIMALAYA, alt. 5–11,000 ft., from Kashmir to Bhotan; *Wallich, Griffith*, &c. KHASIA MTS., alt. 4–5000 ft.; *De Silva, H. f. & T.*

A large tree. *Leaflets* 3–4 pairs, 4 by $1\frac{1}{4}$ in., acutely acuminate, serratures close shallow (in the Khasian *F. urophylla* more distant and coarse), glabrous, when young pilose on the nerves beneath; petiolules $\frac{1}{4}$ in. *Pedicels* $\frac{1}{6}$ in., in tufts on the branches of the panicle. *Calyx* $\frac{1}{16}$–$\frac{1}{24}$ in.; teeth acutely triangular in the typical Kumaon plant, hardly any in the East Himalayan. *Corolla-lobes* $\frac{1}{8}$–$\frac{1}{6}$ in., linear-oblong. *Filaments* $\frac{1}{12}$ in. *Style* short; stigma long, deciduous *Samara* $\frac{1}{5}$ in. wide upwards, narrowed to the width of the seed at base.—*F. retusa*, Champ. (according to *Benth. Fl. Hongk.* 214), differs in the retuse samara and the subtruncate calyx; but, if these characteristics are specific, the East Himalayan and Khasian examples must be referred to *F. retusa*. The Hongkong *retusa* differs however in the smaller samara, which when fully ripe is less than 1 in. The flowers appear to grow larger westward; in Wallich's type example of *F. floribunda* the petals are fully $\frac{1}{6}$ in.

2. **F. Griffithii,** *Clarke*; leaflets elliptic obtusely acuminate entire coriaceous, secondary nerves obscure, samaras 1 in. very narrow obtuse or emarginate.

MISHMEE; "summit of a high mountain," *Griffith* (Kew Distrib. n. 3677).

Griffith's example is in ripe fruit, and is perhaps a var. of *F. floribunda*, but differs more from it and from *F. retusa* than these do from each other. The leaflets are very thick, acuminate, rostrate, rounded and sometimes widened at the tip.

SECT. II. **Fraxinaster.** *Petals* 0. *Flowers* polygamous or diœcious. *Pedicels* in fruit racemed or subfascicled.

3. **F. excelsior,** *Linn.*; *DC. Prodr.* viii. 276; leaflets 2–5 pairs all sessile or nearly so, calyx in all the flowers obsolete, pedicels in fruit racemed. *Engl. Bot.* t. 1692; *Lamk. Ill.* t. 858, fig. 1; *Brand. For. Fl.* 303; *Boiss. Fl. Orient.* iv. 39. F. heterophylla, *Vahl Enum.* i. 53 (*and several others*). F. Moorcroftiana, *Wall. Cat.* 2834; *DC. l. c.* 275, *not of Brandis.* Ornus Moorcroftiana, *G. Don Gen. Syst.* iv. 57.

TEMPERATE WEST HIMALAYA and WESTERN TIBET, alt. 4–9000 ft.; Ladak; *Moorcroft*; Kashmir, frequent; *Jacquemont*; Jamu and Kishtwar, *T. Thomson.*—DISTRIB. From the Caucasus westwards to Britain.

A large tree. *Leaflets* 4 by $1\frac{3}{4}$ in., elliptic, acuminate, serrate sessile or very nearly so, midrib beneath glabrous or minutely pubescent. *Flowers* in short racemes, fascicled near the tips of the branches, appearing before the leaves; male and hermaphrodite alike without perianth. *Filaments* very short. *Racemes* in fruit 1–6 in., pendulous; pedicels $\frac{1}{4}$ in.; samaras $1\frac{2}{3}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., narrowed gradually to both the obtuse ends.—In the absence of flowers Brandis hesitates about identifying this with *F. excelsior*, but the tree is plentiful in Kashmir hills and exactly like the common Ash.

4. **F. xanthoxyloides,** *Wall. Cat.* 2833; leaflets 3–5 pairs lowest petiolulate, calyx 0 in the male flowers small in the hermaphrodite, pedicels in fruit in very short racemes or subfascicled. *DC. Prodr.* viii. 275; *Brand. For. Fl.* 304; *Boiss. Fl. Orient.* iv. 41. F. Moorcroftiana, *Brand. For. Fl.* 304, *not of Wall.* Ornus xanthoxyloides, *G. Don Gen. Syst.* iv. 57.

TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 3–9000 ft., abundant in places (*Brandis*).—DISTRIB. Cabul and Beloochistan.

A tree 25 ft., or more often a shrub. *Leaflets* 2 by $\frac{3}{4}$ in., hardly acuminate, crenulate-serrate, glabrous, or often slightly hairy near the base of the midrib beneath; lowest petiolules usually $\frac{1}{6}$ in., distinct, sometimes subobsolete. *Flowers* appearing before the leaves in dense heads, brown from the woolly bracts. *Filaments* short; anthers oblong. *Racemes* in fruit $\frac{1}{2}$ in., or the pedicels $\frac{1}{4}$ in., appearing fascicled. *Calyx* in fruit often $\frac{1}{30}$ in., obtuse, striated lengthwise or not. *Fruit* $1\frac{1}{2}$ by $1\frac{1}{4}$ in.—The Cabul examples of Griffith have the samara $\frac{1}{7}$ (sometimes very nearly $\frac{1}{5}$) in. broad. *F. dimorpha*, Coss. & Dur., from Algiers, does not appear to differ except in all the leaflets being sessile or very nearly so.

6. **OSMANTHUS,** *Lour.*

Evergreen shrubs or trees, glabrous. *Leaves* opposite, entire or serrate. *Flowers* axillary and terminal, fascicled or in very short racemes; hermaphrodite or polygamous. *Calyx* 4-toothed or -lobed. *Corolla-tube* short or long; lobes 4, elliptic, obtuse, imbricated. *Stamens* 2, subsessile on the corolla-tube. *Ovary* 2-celled; style short or cylindric, 2-lobed or subentire; ovules 2 in each cell, pendulous from its apex. *Drupe* ovoid or globose; endocarp bony or crustaceous. *Seeds* pendulous, usually solitary, albumen fleshy; radicle superior.—DISTRIB. Species 8, extending from the N.W. Himalaya through China and Japan to Western N. America.

The character of this genus is here considerably widened from that of Gen. Pl. (ii. 677), to include *O. suavis*, King.

1. **O. fragrans,** *Lour. Fl. Cochinch.* i. 29; leaves lanceolate acuminate, calyx minute, corolla less than $\frac{1}{6}$ in. tube very short. *DC. Prodr.* viii. 291. Olea fragrans, *Thunb. Fl. Jap.* 18, t. 2; *Roxb. Hort. Beng.* 3, *and Fl. Ind. ed.*

Carey & Wall. i. 104; *Wall. Cat.* 2810; *Bot. Mag.* t. 1552; *Blume Mus. Bot.* i. 316; *Brand. For. Fl.* 309. O. acuminata, *Wall. Cat.* 2809; *DC. l. c.* 285.

TEMPERATE HIMALAYA, alt. 4–7000 ft., from Gurwhal to Sikkim; *Wallich, H. f. & T.*, &c. KHASIA MTS.; *Griffith, Lobb.* (According to Brandis only planted in Gurwhal and Kumaon).—DISTRIB. China, Japan, cultivated.

A small tree or a shrub. *Leaves* 7 by 2 in., entire in the wild plants, often serrated in the cultivated, coriaceous; petiole $\frac{2}{3}$ in. *Pedicels* $\frac{1}{4}$–$\frac{3}{4}$ in., densely fascicled, often in the upper axils, rarely terminal. *Calyx* less than $\frac{1}{30}$ in., 4-toothed. *Corolla* divided nearly to the base; lobes oblong. *Drupes* $\frac{3}{4}$ by $\frac{1}{2}$ in., ellipsoid.—The fruit is only known from the Kumaon tree (a cultivated plant, ex *Brandis*). The cultivated *O. fragrans* is not known to produce fruit elsewhere.

2. **O. suavis,** *King in Herb. Calc.*; leaves lanceolate acute, calyx $\frac{1}{8}$–$\frac{1}{6}$ in. deeply 4-lobed, corolla-tube $\frac{1}{8}$–$\frac{1}{4}$ in. Olea sp., *Griff. Itin. Notes*, 156, n. 785.

SUBALPINE HIMALAYA; Sikkim and East Nipal, alt. 9–10,000 ft., Tonglo and Kalapookree, *J. D. H., King*; Bhotan *Griffith.*

A bush, 12 ft., or a small tree (*King*). *Leaves* $3\frac{1}{4}$ by 1 in., acute, base cuneate, minutely crenate-serrate, coriaceous; petiole $\frac{1}{6}$ in. *Pedicels* 0–$\frac{1}{4}$ in., in dense axillary and terminal fascicles. *Flowers* polygamous. *Calyx-lobes* oblong, obtuse, microscopically pubescent. *Corolla-tube* $\frac{1}{4}$ in. and upwards (both in the male and hermaphrodite flowers) in King's specimens; in Griffith's varying from $\frac{1}{10}$ to $\frac{1}{5}$ in. (in flowers male or nearly male); corolla-lobes $\frac{1}{6}$ in., strongly imbricated in the bud. *Anthers* subsessile near the top of the tube, elliptic, acute. *Style* $\frac{1}{8}$ in., tip bifid. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., ellipsoid; endocarp thin, crustaceous. *Albumen* copious, fleshy.—Griffith made a long MS. note on this species: it does not agree well with *Osmanthus* to which King refers it, but there appears no other place for it unless a new genus.

7. LINOCIERA, *Swartz.*

Shrubs or trees. *Leaves* opposite, entire. *Flowers* in axillary (rarely terminal) panicles or cymes, often in small terminal fascicles; bracts at the divisions small. *Calyx* small, 4-fid. *Petals* 4, long or short, nearly free, or cohering by pairs, or very shortly connate, induplicate-valvate in bud. *Stamens* 2; filaments short; anthers elliptic, dehiscing on the margin. *Ovary* 2-celled; style short, stigma obscurely bifid or entire; ovules 2 in each cell, pendulous from its apex. *Drupe* ellipsoid (rarely globose); endocarp bony or crustaceous. *Seed* usually solitary, pendulous, testa thin, albumen fleshy plentiful or 0; radicle superior.—DISTRIB. Species 40, in the tropics of both hemispheres.

Olea only differs by having the corolla more distinctly tubular. Many authors place the albuminous species in *Olea*, and the exalbuminous in *Linociera*; but the albumen is unknown in so many species that this arrangement is inconvenient, while it throws into different genera the very long-petaled species closely allied in every point except the albumen.

SECT. I. **Eulinociera.** *Seeds* albuminous (*Petals* elongate).

1. **L. malabarica,** *Wall. Cat.* 2828; leaves broadly oblong hardly acuminate, flowers in small clusters, calyx-lobes grey-pilose, petal $\frac{1}{4}$ in. linear-lanceolate connected in pairs, ovary pilose. *DC. Prodr.* viii. 297; *Wight Ic.* t. 1246; *Dalz. & Gibs. Bomb. Fl.* 159. Chionanthus malabarica, *Bedd. For. Man.* 154, and *Fl. Sylv.* t. 239, *fig. in corner.*

DECCAN PENINSULA; from the Concan, *Dalzell*, to Courtallum, *Wight*; frequent.

A small tree. *Leaves* 4 by $1\frac{3}{4}$ in., subobtuse or very suddenly narrowed to an obtuse apex, base cuneate, glabrous, coriaceous, nerves obscure; petiole $\frac{1}{4}$ in. *Peduncles* short, axillary, fascicled, numerous, grey-pilose, sparingly panicled; bracts $\frac{1}{30}$ in., ovate, grey-pilose. *Calyx-lobes* $\frac{1}{24}$ in., ovate, grey-pilose on the back.

Petals white. *Style* shortly bifid. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., ellipsoid; endocarp thin, crustaceous. *Testa* thin, albumen plentiful.

2. **L. Wightii,** *Clarke*: leaves elliptic acuminate or rostrate, flowers in small clusters, calyx-lobes glabrous on the back ciliate, petals $\frac{1}{3}$ in. linear-lanceolate connected in pairs often for one-third their length, ovary glabrous. Olea linocieroides, *Wight Ic.* t. 1241; *Bedd. For. Man.* 152.

DECCAN PENINSULA; Courtallum; *Wight*. Tinnevelly Ghauts, alt. 1–3000 ft., *Beddome*.

A small tree. *Leaves* 4 by $1\frac{3}{4}$ in., base obtusely cuneate, coriaceous, nerves obscure or somewhat plainly inarching; petiole $\frac{1}{5}$ in. *Peduncles* short, axillary, clustered, glabrous, sparingly panicled; bracts $\frac{1}{30}$ in., ovate, glabrous. *Calyx-lobes* $\frac{1}{24}$ in., ovate. *Drupe* $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., ellipsoid; endocarp thin, crustaceous. *Testa* thin, albumen plentiful.—Hardly differs from *L. malabarica*, but by the points specified in the diagnosis. Wight's Herbarium contains the ripe fruit, which is as depicted by him.

SECT. II. **Ceranthus.** *Seeds* exalbuminous. (Several species, in which the seed is not known may prove to be *Oleas*.)

3. **L. purpurea,** *Vahl Enum.* i. 47; leaves obovate-oblong obtuse coriaceous, panicles very small closely pubescent, petals 4 subequal $\frac{1}{10}$ in., drupe $\frac{1}{2}$–$\frac{2}{3}$ in. ellipsoid. *Wall. Cat.* 2829; *DC. Prodr.* viii. 297. Chionanthus zeylanica, *Linn.*; *Thwaites Enum.* 188; *Roxb. Fl. Ind. ed. Carey & Wall.* i. 107; *Bedd. For. Man.* 154. Thouinia nutans, *Linn. f. Suppl.* 89.

CEYLON; common in the hotter parts of the island.

A small tree; branchlets minutely pubescent. *Leaves* $2\frac{1}{4}$ by 1 in., tip very obtuse or rounded, base attenuate, nerves slightly impressed beneath distinctly inarching; petiole $\frac{1}{6}$ in. *Panicle* $\frac{1}{2}$–1 in., somewhat dense, grey-pubescent; lower bracts $\frac{1}{5}$ in., lanceolate, upper $\frac{1}{30}$ in., ovate. *Calyx* very small. *Ovary* glabrous.

VAR. *dichotoma*, Wall. Cat. 2825 (sp.); leaves elliptic or oblong subacute at both ends very coriaceous nerves less distinct, panicles 1–4 in. lax nearly glabrous, petals $\frac{1}{8}$–$\frac{1}{6}$ in. *DC. Prodr.* viii. 297.—Ceylon.

4. **L. albidiflora,** *Thwaites Enum.* 189; leaves elliptic shortly suddenly rostrate coriaceous, panicles small nearly glabrous, petals 4 subequal $\frac{1}{6}$–$\frac{1}{4}$ in. and upwards, drupe $\frac{1}{2}$–$\frac{2}{3}$ in. Chionanthus axillaris, *R. Br. Prodr.* 523?.

CEYLON; alt. 1–3000 ft., abundant, *Thwaites*.—DISTRIB. Australia.

A small tree; nearly glabrous. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in.; nerves beneath slightly impressed, distinctly inarching. *Panicles* $\frac{1}{2}$–1 in.; bracts $\frac{1}{30}$ in., ovate, minutely ciliate-pubescent. *Calyx* $\frac{1}{20}$ in., glabrous; lobes minutely ciliate-pubescent. *Petals* pale yellow (Thwaites). *Ovary* glabrous.—This seems hardly specifically distinct from *L. purpurea* if in that species we include the larger flowered *L. dichotoma*. Beddome (*For. Man.* 154) reduces it with confidence to *L. malabarica*; but (apart from the presence of albumen) *L. malabarica* has the flowers in small capitate clusters at the extremities of peduncles much longer than the heads themselves. The example communicated from Australia by F. Mueller appears identical with the Ceylon specimens; F. Mueller is very probably right in supposing it to have been *Chionanthus axillaris*, R. Br., but the diagnosis of Brown is very short.

VAR. *rostrata*, Thwaites Enum. Pl. Zeyl. 189 (sp.); fruit 1 by $\frac{1}{3}$ in.—Ceylon; Hinidoon Corle, *Thwaites*.—Except in the somewhat larger fruit, Thwaites' examples of this appear identical with his *L. albidiflora*.

5. **L. leprocarpa,** *Thwaites Enum.* 189; leaves oblong acuminate coriaceous, panicles small minutely glandulose-pilose, drupe ovoid large. Chionanthus leprocarpa, *Bedd. For. Man.* 154.

CEYLON; Central Province, alt. 3–4000 ft., rather rare, *Thwaites*.

Appears closely allied to *L. purpurea*. *Leaves* $5\frac{1}{2}$ by $1\frac{1}{2}$ in., base narrowly cuneate,

very thick; nerves beneath somewhat obscure, inarching. *Fruit* 1 by $\frac{2}{3}$ in., rough, blotched, fide *Thwaites*, but when dry does not differ in this respect from the neighbouring species.—Thwaites's example is not in flower; nor does Thwaites explicitly state that the seed is exalbuminous.

VAR. *courtallensis*; leaves elliptic-oblong subacute hardly acuminate drying reddish. Chionanthus courtallensis, *Bedd. For. Man.* 154.—Courtallum, *Wight*. Tinnevelly Ghats; *Beddome*.—A good-sized tree (*Beddome*), glabrous. *Leaves* $7\frac{1}{2}$ by $2\frac{1}{2}$ in., nerves beneath subobscurely inarched. *Panicles* $\frac{1}{2}$–1 in., usually reduced to 3–5 subsimple racemes fascicled in each axil, glabrous. *Petals* scarcely $\frac{1}{6}$ in. *Drupe* unknown. —The flowers of this have been in the Herbarium matched with the fruit of *L. leprocarpa*; the identification must be uncertain until further material is received.

6. **L. intermedia,** *Wight Ic.* t. 1245; glabrous, leaves elliptic-oblong acute at both ends secondary nerves prominent, panicles compound somewhat dense, petals $\frac{1}{6}$ in. narrowly oblong, drupe $\frac{2}{3}$ by $\frac{1}{3}$ in. Chionanthus intermedia, *Bedd. Fl. Sylv.* t. 239.

NILGHERRIES, alt. 1–6000 ft.; *Wight, Hohenacker*, &c. ANAMALLAYS; alt. 5000 ft., *Beddome*.

A large tree, *Beddome*, more often small. *Leaves* $6\frac{1}{2}$ by $2\frac{1}{2}$ in., chartaceous; nerves 10 pairs, reticulations many prominent; petiole $\frac{1}{2}$–1 in. *Panicle* 2–5 in.; branches compressed; bracts $\frac{1}{30}$ in., ovate; pedicels often hardly any. *Calyx* $\frac{1}{16}$ in., lobes ovate glabrous. *Petals* 4, shortly united at the base, obscurely disposed in pairs. *Ovary* glabrous.—Chionanthus picrophloia, *F. Muell. Fragm.* iii. 139, t. 24, does not appear to differ; the inflorescence in the picture is subcapitate, but in the specimens is densely paniculate, as in *L. intermedia*.

VAR. *Roxburghii*; panicles smaller, drupes scarcely $\frac{1}{2}$ in., seed exalbuminous. Olea paniculata, *Roxb. Catal. Pl.* (1813), and *in Fl. Ind. ed. Carey & Wall.* i. 104. O. Roxburghii, *Spreng. Syst.* i. 34; *Wight Ic.* t. 735, *not of Wall.* O. Roxburghiana, *Roem. et Sch. Mant.* i. 77; *DC. Prodr.* viii. 286; *Dalz. & Gibs. Bomb. Fl.* 159; *Bedd. For. Man.* 153.—Orissa and Circars, *Roxburgh*. Chota Nagpore, alt. 2–5000 ft.; *J. D. H.*, &c. Western Ghats; *Dalzell, Beddome*, &c.—Sumbulpore; *Griffith*. Siwaliks; *Edgeworth*. At 4500 ft. alt. this is a gnarled tree 25 ft. high. The examples of Griffith and Edgeworth have narrower (obovate-lanceolate) leaves. Linociera? oblonga, *Wall. Cat.* 2843, from Ava, appears the same, but the example consists of very young fruits and leaves only.

7. **L. pauciflora,** *Clarke*; glabrous, leaves large elliptic-oblong somewhat acuminate coriaceous, panicles very small. Olea pauciflora, *Wall. Cat.* 2812, *letter* a *only*; *DC. Prodr.* viii. 288, *partly*.

PENANG; *Wallich*.

Leaves $7\frac{1}{2}$ by $2\frac{1}{2}$ in., shortly obtusely acuminate, base cuneate; nerves 11 pairs, subprominent beneath, secondary nerves obscure; petiole $\frac{1}{4}$ in. *Panicles* reduced to subsimple erect spikes 1 in. *Flowers* in bud, seem likely to be small. *Drupe* not seen.—This could hardly be distinguished from *L. leprocarpa*, var. *courtallensis*, but by the subsolitary racemes. If, however, as Wallich supposed, the next variety is really its young fruit, it must be altogether different.

VAR. *evolutior*; nerves more distinct, petioles 1–$1\frac{1}{4}$ in., panicles in young fruit 2–6 in. compound lax, branches stout angular, pedicels thickened. L. pauciflora, *Wall. Cat.* 2812, b *only*.—Penang; *Wallich*. Tenasserim or Andamans, *Helfer*.—The seeds are immature but probably exalbuminous.

VAR. *palembanica*; leaves as of *L. pauciflora*, Wall. a, panicles 2–5 in. compound, petals $\frac{1}{10}$ in. elliptic-oblong, fruits not seen. Chionanthus palembanica, *Miq. Fl. Ind. Bat. Suppl.* 558; *Kurz For. Fl.* ii. 159, and *in Journ. As. Soc.* 1877, pt. ii. 243.—Andamans; *Kurz, Helfer*.—Kurz says the drupe is 1–$1\frac{1}{2}$ in., ovoid to oblong. In one branch of Helfer's the petioles vary from $\frac{1}{4}$ to $\frac{3}{4}$ in. The upper bracts are sometimes $\frac{1}{2}$ in., subfoliaceous, both in Miquel's and Helfer's examples.

8. **L. terniflora,** *Wall. Cat.* 2845; leaves oblong acuminate coriaceous, nerves inarching distinct on both surfaces, flowers in small heads in small pubescent panicles, petals $\frac{1}{8}$–$\frac{1}{6}$ in. united in pairs, ovary pilose. *DC. Prodr.* viii. 297. Olea terniflora, *Kurz For. Fl.* ii. 157, and *in Journ. As. Soc.* 1877, pt. ii. 244.

BIRMA; on the Saluen, *Wallich*; Pegu –Yomah, *Kurz.*

Innovations fulvous-pilose. *Leaves* $6\frac{1}{2}$ by 2 in., sometimes more elliptic, glaucous-green, narrowed at both ends, apex obtuse; nerves 8 pairs, impressed above; petiole $\frac{1}{3}$ in. *Panicles* 1–3 in., divaricate with few heads, grey-pubescent; heads often 3-flowered. *Calyx* $\frac{1}{20}$ in.; lobes broad, patent, thin, ciliate-pubescent. *Petals* united about one-third their length. *Ovary* minutely pilose; style twice as long as the ovary, pilose below. *Drupe* $\frac{1}{3}$ by $\frac{1}{4}$ in.; seed exalbuminous in Kurz's own example, who nevertheless removes the species to *Olea.*—Setting aside the albumen, the species appears closely allied to *Linociera malabarica.*

VAR. *acuminata,* Wall. Cat. 2844 (sp.); primary nerves obscure somewhat impressed beneath not prominently inarched, petals united in pairs for half their length, ovary densely pilose, style much shorter than the ovary. *DC. Prodr.* viii. 298. Linociera sp. n. 6, *Herb. Ind. Or. H. f. & T.* Birma; on the Saluen, *Wallich*; Moulmein; *Griffith* (Kew Distrib. n. 3689); Chittagong; *H. f. & T.*

9. **L. insignis,** *Clarke*; leaves large obovate-lanceolate, panicles compound pubescent, petals 4 nearly free oblong-linear. Chionanthus insignis, *Miq. Fl. Ind. Bat. Suppl.* 559. Ch. montanus, *Kurz For. Fl.* ii. 159, and *in Journ. As. Soc.* 1877, pt. ii. 243, *not of Blume.*

TENASSERIM, *Helfer* (Kew Distrib. n. 3688); Martaban, alt. 1–2000 ft., rather rare, *Kurz.*—DISTRIB. Sumatra.

A small tree (*Kurz*); innovations ashy-pubescent. *Leaves* $9\frac{1}{2}$ by $2\frac{3}{4}$ in., shortly acuminate, base attenuated, glabrous; nerves 12 pairs, prominent beneath, secondary obscure; petiole $1\frac{1}{4}$ in. *Panicles* 2–4 in., ashy-pubescent; bracts $\frac{1}{6}$ in., linear, some $\frac{3}{4}$ in., subfoliaceous, often added; pedicels often hardly any. *Calyx* $\frac{1}{20}$ in., pubescent; lobes deep, almost acute. *Petals* $\frac{1}{8}$-$\frac{1}{6}$ in., oblong, margins much incurved. *Ovary* microscopically pilose; style as long as the ovary, terminated by 2 short lobes. *Drupe* 1 in. (*Kurz*); the fruit in the examples seen is very imperfectly ripe, but seems likely to be larger.—*Chionanthus macrocarpa,* Blume (Mus. Bot. i. 319), has drupes $1\frac{1}{2}$ by $\frac{3}{4}$ in. and obtuse petals, but the leaves and inflorescence are exceedingly like the present plant. Kurz supposes the Tenasserim plant to be *Chionanthus montana,* Blume (altered to *Ch. monticola* in Mus. Bot. i. 317), but the plentiful examples communicated show this to be a totally different species with much smaller leaves and very small glabrous panicles.

10. **L. minutiflora,** *Clarke*; leaves obovate-oblong subacute, panicles compound, calyx nearly glabrous, petals $\frac{1}{8}$ in. free narrowly oblong. Chionanthus minutiflora, *Kurz For. Fl.* ii. 159, and *in Journ. As. Soc.* 1877, pt. ii. 243.

MARTABAN HILLS; east of Tounghoo, *Brandis.*

Leaves $4\frac{1}{2}$ by $1\frac{3}{4}$ in., base cuneate, coriaceous; nerves few, slender, prominent beneath, secondary obscure; petiole $\frac{1}{4}$ in. *Panicles* 3–4 in., minutely ashy-pubescent, branches in flower long slender; bracts $\frac{1}{16}$ in., linear; pedicels hardly any. *Calyx* $\frac{1}{12}$ in.; lobes ovate, glabrous or puberulous. *Ovary* glabrous; style very short. *Drupe* not seen. The examples from Kurz's herbarium are very imperfect; they appear closely allied to *L. laxiflora,* Blume (common in Malaya), which has, however, a very pubescent calyx.

11. **L. macrophylla,** *Wall. Cat.* 2826; leaves large long-petioled oblong acute distinctly nerved, panicles compound dense less than one-third as long as the leaves glabrous, pedicels 0–$\frac{1}{8}$ in., petals $\frac{1}{8}$ in. nearly free oblong, drupe $\frac{3}{4}$ by $\frac{1}{3}$ in. *DC. Prodr.* viii. 297. Chionanthus macrophylla, *Kurz For. Fl.* ii. 159, and *in Journ. As. Soc.* 1877, pt. ii. 243.

SILHET; *Wallich.* ASSAM; *Griffith, Jenkins.* KHASIA; *Griffith.*

A small tree; glabrous or nearly so. *Leaves* 8 by 2¼ in. (sometimes 9½ by 4 in.), acute at both ends, chartaceous, often punctate on the upper surface; nerves 10–13 pairs, secondary distinct; petiole 1–1¼ in. *Panicles* 1–1½ in. in the type specimens, 1–4 in. in cultivated ones; bracts minute. *Calyx* glabrous. *Petals* obtuse, margins little incurved. *Ovary* glabrous; style short. *Fruit* elongate ellipsoid, on greatly thickened pedicels; endocarp crustaceous; testa thin; albumen 0.

VAR. *attenuata*; panicle more lax, in fruit slenderer with pedicels less thickened. L. tenuiflora, *Wall. Cat.* 2827; *DC. Prodr.* viii. 298. Olea attenuata, *Wall. Cat.* 2839; *DC. l. c.* 286. Chionanthus ramiflora, *Roxb. Hort. Beng.* 3, and *Fl. Ind. Carey & Wall.* i. 106; *Benth. Fl. Austral.* iv. 301. Phillyrea ramiflora, *Roxb. Ic. Ined.*—Pegu and Tenasserim; *Wallich, Griffith.* Andamans; *Kurz.*—DISTRIB. Ava, Malaya, Tropical Australia.—This has been placed as a variety of *L. intermedia*, Wight, and it does not greatly differ but by the smaller flowers and the much slenderer panicle.—*L. ramiflora*, Wall. Cat. 2824 (*DC. l. c.* 297), cultivated specimen, is remarkable for the intricately divaricately ramous panicle, the pedicels being nearly all ⅕ to ¼ in. The whole series only differs in the development of the panicle, and (slightly) in the size of the flowers; and perhaps *L. intermedia, macrophylla* and *ramiflora* (with their varieties) form but one species, extending over Southern and Eastern India, Malaya and Australia.

SPECIES NOT SEEN.

L. COTINIFOLIA, *Vahl*; *DC. Prodr.* viii. 297; is founded on *Pluk. Alm.* t. 241, fig. 4, which represents a Ceylon shrub with leaves very villous beneath and 5-merous flowers, and is therefore not of the genus.

L. ? LORANTHIFOLIA, *Wall. Cat.* 2842, from Amherst, has only twigs and a few leaves which resemble those of *Salvadora persica.*

L. MUELLERI, *Van Heurck Pl. Nov.* 124, collected by Griffith near Malacca, is perhaps *Bouea microphylla*, Griff.; J. D. Hook. Fl. Brit. Ind. ii. 21. (It has 4 stamens).

CHIONANTHUS ? GHÆRI, *Gaertn.*; *DC. Prodr.* viii. 295; from Ceylon, of which the leaves and flowers are unknown, remains obscure.

NOTELÆA POSUA, *Don Prodr.* 107; leaves opposite elliptic-oblong acuminate, peduncles axillary drooping clustered 1-flowered, calyx-teeth equal, stigma capitate.

NIPAL; Narainhetty, *Hamilton* (fide *Don*). Probably a *Linociera.*

Leaves 4–5 by 1½–2 in. *Petals* 4, ovate united at the base in pairs by the filaments. *Drupe* with subchartaceous endocarp.—Copied from Don.

8. **OLEA,** *Linn.*

Trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* small, hermaphrodite diœcious or polygamous, in axillary or terminal panicles; bracts minute. *Calyx* small, 4-toothed or -lobed. *Corolla-tube* short; lobes 4, induplicate-valvate, or 0. *Stamens* 2, on the corolla-tube or subhypogynous, filaments short; anthers oblong. *Ovary* 2-celled; style short, stigma ovate or shortly 2-lobed; ovules 2 in each cell, subpendulous or attached laterally to the septum. *Drupe* ellipsoid or subglobose, endocarp bony or crustaceous, usually 1-seeded. *Seed* pendulous, albumen fleshy; radicle superior.—DISTRIB. Species 35 in the Old World, from the North Temperate Zone to South Africa and New Zealand.

1. **O. cuspidata,** *Wall. Cat.* 2817; leaves oblong, nerves beneath entirely obscured by felted ferruginous scales, panicles short axillary, flowers bisexual corolloid, ovary glabrous, drupe ⅓ in. ellipsoid. *DC. Prodr.* viii. 285; *Brand. For. Fl.* 307, t. 38; *Boiss. Fl. Orient.* iv. 36. O. ferruginea, *Royle Ill.* 257, t. 65, fig. 1.

NORTH WEST HIMALAYA and KASHMIR, alt. 2–6000 ft., frequent. DISTRIB. Cabul, Beloochistan.

A tree, 30 ft., glabrous, not spinous. *Leaves* $2\frac{1}{4}$ by $\frac{3}{4}$ in., narrowed at both ends, usually obtuse or subacute, sometimes cuspidate, very coriaceous; midrib prominent beneath, scales of the lower surface circular peltate closely toothed; petiole $\frac{1}{6}$–$\frac{1}{5}$ in. *Panicles* 1–2 in., minutely scaly; flowers perfect, but many with reduced ovary are functionally male. *Calyx* $\frac{1}{20}$ in., subtruncate, glabrous. *Corolla* deeply divided; lobes $\frac{1}{16}$ in., elliptic, obtuse. *Endocarp* bony.—This was supposed a var. of the Wild Olive by Dr. Stewart; Brandis says it differs by the more lax inflorescence, the upper surface of the leaves glossy, not dull grey, the lower surface reddish instead of white, smaller fruit, the absence of spines, and a more distinctly marked heartwood. The cuspidation of the leaves, distinct in Wallich's specimen, and relied on by Boissier as a diagnostic mark, proves variable in the Indian plant.

2. **O. glandulifera,** *Wall. Cat.* 2811; leaves rhomboid-lanceolate entire, nerve-axils glandular, secondary nerves distinctly reticulating, panicles mostly terminal glabrous or nearly so, flowers bisexual corolloid, ovary glabrous or nearly so, drupe $\frac{1}{3}$ in. ovoid. *DC. Prodr.* viii. 285; *Wight Ic.* t. 1238; *Bedd. Fl. Sylv.* t. 238; *Brand. For. Fl.* 309, *excl. syn.*

North-west Himalaya, alt. 2–6000 ft., from Kashmir to Nipal. Mts. of South India; *Wight, Beddome*, &c.

A tree, 20–60 ft.; glabrous or nearly so. *Leaves* 4 by 2 in., acuminate, base cuneate, margin undulate; petiole $\frac{3}{8}$ in. *Panicles* nearly always terminal, some smaller in the penultimate axils sometimes added, 2–5 in. diam., broad, compound; pedicels 0–$\frac{1}{3}$ in. *Calyx* minute, 4-lobed, glabrous or obscurely pubescent on the margin. *Corolla* deeply divided, lobes $\frac{1}{8}$ in., elliptic, obtuse. *Anthers* broad, large. *Ovary* glabrous or (fide *Wight*) minutely hairy. *Endocarp* bony.

3. **O. dioica,** *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 105; leaves elliptic-lanceolate toothed or entire coriaceous, secondary nerves obscure, panicles axillary glabrous, flowers diœcious males with corolla females without, ovary glabrous or with hard tomentum, drupe $\frac{1}{2}$–$\frac{5}{8}$ in. ellipsoid often subacute. *Wall. Cat.* 2814; *Wight Ill.* t. 151; *DC. Prodr.* viii. 286; *Dalz. & Gibs. Bomb. Fl.* 159; *Bedd. For. Man.* 154; *Kurz For. Fl.* ii. 157, and *in Journ. As. Soc.* 1877, pt. ii. 244. O. Wightiana, *Wall. Cat.* 2815. O. Heyneana, *Wall. Cat.* 2823; *DC. Prodr.* viii. 288.

In the lower hills, from Assam and Bengal throughout the Deccan Peninsula; common. Chittagong Hills; *Roxburgh.*

A tree 30–60 ft.; glabrous. *Leaves* $5\frac{1}{2}$ by $2\frac{1}{3}$ in., base cuneate; nerves 10 pairs, elevated beneath; petiole $\frac{1}{4}$ in. *Panicles* 2–6 in., very compound, shining (female usually smaller); pedicels 0–$\frac{1}{8}$ in. *Calyx* minute; lobes ovate, glabrous or margin obscurely pubescent. *Corolla* of the males deeply lobed; lobes $\frac{1}{10}$ in., elliptic, obtuse; of the females wanting in the examples seen (Kurz says present). *Endocarp* crustaceous.—*O. Wightiana*, Wall., is a form from Assam with large leaves but shorter subglobose drupes; in the typical *O. dioica* the drupes are often subacute.

4. **O. maritima,** *Wall. Cat.* 2813; branchlets hairy, leaves elliptic-lanceolate entire or toothed coriaceous, secondary nerves obscure, panicles axillary hairy, flowers diœcious, drupe $\frac{1}{5}$ in. globose. *G. Don Gen. Syst.* iv. 49; *DC. Prodr.* viii. 288. Pachyderma javanicum, *Blume Bijd.* 682. Stereoderma javanicum, *Blume*; *DC. l. c.* 290. Tetrapilus brachiatus, *Lour. Fl. Cochinch.* 611. Notelæa Zollingeriana, *Teijs. & Binn. Cat. Hort. Bog.* 122.

Malacca and Singapore; *Wallich, Griffith*, &c., frequent.—Distrib. Malaya, Cochinchina.

A small tree. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., base cuneate, glabrous; petiole $\frac{1}{4}$ in. *Panicles* 1–4 in., compound; bracts minute or a few $\frac{1}{2}$–$\frac{3}{4}$ in. narrow lanceolate, caducous; pedicels 0–$\frac{1}{8}$ in. *Calyx* minute; lobes ovate, pubescent. *Corolla* (in the males) $\frac{1}{12}$–$\frac{1}{10}$ in., divided deeply; lobes elliptic, obtuse; of females not seen. *Endocarp* somewhat bony.—Without fruit, this greatly resembles *Olea dioica*, but the branchlets

and panicles have many minute soft spreading hairs. Wight supposed it to be *Olea microcarpa*, Vahl (i.e. Phillyrea indica, *Lour. Fl. Cochinch.* 19), but Loureiro says his plant had terminal inflorescence, so that it should more probably be one of the globose-fruited *Ligustrums* allied to (or identical with) a Khasia or Chinese species.

5. **O. dentata,** *Wall. Cat.* 2840; branchlets hairy, leaves oblong-lanceolate toothed or entire coriaceous, secondary nerves obscure, panicles axillary large hairy, flowers diœcious, corolla in both sexes campanulate shortly 4-fid. *DC. Prodr.* viii. 286; *Kurz For. Fl.* ii. 157, and *in Journ. As. Soc.* 1877, pt. ii. 245.

British Birma; *Griffith* and *Helfer* (Kew Distrib. n. 3690), *Parish*, &c.; Martaban and Tenasserim, alt. 2–3000 ft., frequent (*Kurz*).

A tree, 40–60 ft. (*Kurz*). *Leaves* 5 by $1\frac{1}{4}$ in., base cuneate or subobtuse, glabrous or sometimes hairy beneath; nerves slender, often subimpressed beneath; petiole $\frac{1}{4}$ in. *Panicles* (both male and female) 3–6 in., brachiate; bracts small, linear or $\frac{1}{2}$–$\frac{3}{4}$ in., very narrow, hairy; pedicels 0–$\frac{1}{16}$ in., with flowers in threes. *Calyx* minute; lobes ovate, pubescent. *Corolla* $\frac{1}{6}$–$\frac{1}{5}$ in., almost tubular-campanulate, subequally 4-lobed. *Ovary* glabrous; style 0; stigma subtruncate. *Drupe* not seen.—This plant has been mixed with *O. maritima*, from which it hardly differs but by the campanulate shortly-divided corolla, and with *Linociera ternifolia*, in which the corolla is nearly divided into 2 bifid petals and the panicle much smaller.

Var. *salicifolia*, Wall. Cat. 2821 (sp.); panicles much less hairy, pedicels $\frac{1}{8}$–$\frac{1}{5}$ in. subumbelled, corolla $\frac{1}{8}$ in., drupes $\frac{1}{2}$ by $\frac{1}{4}$ in. narrow ellipsoid, endocarp bony, seed albuminous. *DC. Prodr.* viii. 286.—Khasia; *Wallich, Griffith*; at the Bor-pani, *H. f. & T.*—This is placed with *O. dentata* by Kurz, the leaves are remarkably similar, and one of Griffith's Mergui examples in flower seems nearer the Khasia *O. salicifolia* than the Birma *O. dentata*; but the seeds of *O. dentata* remain unknown, and may prove to be exalbuminous, when the species will stand near *Linociera terniflora*.

6. **O. Gamblei,** *Clarke*; leaves oblong acuminate entire coriaceous, panicles axillary obscurely pubescent, flowers diœcious both males and females without corolla, drupes $\frac{3}{4}$ by $\frac{1}{3}$ in.

Tropical Sikkim Himalaya; *J. D. H.*; near Punkabari, *Gamble.*

Nearly glabrous. *Leaves* $4\frac{1}{2}$ by $\frac{1}{2}$ in., parallel-sided, long acuminate, base cuneate; nerves obscure; petiole $\frac{1}{4}$ in. *Panicles* $2\frac{1}{2}$ in., brachiate; bracts minute; pedicels 0–$\frac{1}{3}$ in. *Calyx* less than $\frac{1}{30}$ in., subtruncate ciliate. *Anthers* subsessile, oblong, large. *Ovary* glabrous; style short, stigma short bifid. *Fruit* sometimes nearly 1 by $\frac{1}{2}$ in.; endocarp bony. *Seed* albuminous.—One or two hermaphrodite flowers (without corolla) are seen at the base of the female panicles. The New Zealand *O. apetala* has broader less acuminate leaves and shorter, far less compound, subracemose panicles.

7. **O. polygama,** *Wight Ic.* tt. 1239, 1240; glabrous, leaves broadly elliptic suddenly shortly acuminate coriaceous, secondary nerves obscure, panicles axillary, flowers male and hermaphrodite all petaline. *Bedd. For. Man.* 154. O. Gardneri, *Thwaites Enum.* 188; *Bedd. For. Man.* 154.

Nilgherries; Sispara, *Gardner, Wight.* Ceylon; alt. 7000 ft., *Walker, Thwaites.*

A small tree. *Leaves* $2\frac{3}{4}$ by $1\frac{1}{4}$ in., obtuse, mucronate, base cuneate; nerves 8 pairs, subimpressed beneath; petiole $\frac{1}{5}$ in. *Panicles* 1–$2\frac{1}{2}$ in.; male on one tree, female-hermaphrodite on another; bracts inconspicuous; pedicels $\frac{1}{16}$–$\frac{1}{8}$ in., subumbelled. *Flowers* as of *O. dioica*. *Drupe* not seen.—This differs from *O. dioica* slightly; the leaves dry reddish with subincurved margins, the nerves are not elevated beneath; the panicles are smaller; it looks like a high-level, somewhat stunted *O. dioica*.

9. LIGUSTRUM, *Linn.*

Shrubs or trees; branchlets often lenticellate. *Leaves* opposite, entire, glabrous when mature, except in *L. nepalense*, var. *vestita*. *Panicles* terminal, sometimes with foliaceous bracts in the lower part, flowers white or nearly so. *Calyx* small, truncate or shortly 4-toothed. *Corolla* funnel-shaped, tube long or short; lobes 4, induplicate-valvate. *Stamens* 2, on the corolla-tube, filaments short; anthers oblong or rounded. *Ovary* 2-celled; style longish, stigma subclavate oblong hardly 2-fid. *Drupe* 1–3-seeded; endocarp chartaceous or thin. *Albumen* fleshy; radicle superior.—DISTRIB. Species 25, from Europe throughout Asia to Australia.

* *Drupe longer than broad.*

1. **L. robustum,** *Blume Mus. Bot.* i. 313; branches very lenticellate, leaves elliptic narrowed at both ends, nerves slender irregular, panicle large hairy, corolla-tube as long as the calyx, drupe $\frac{1}{2}$ by $\frac{1}{5}$ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 29, *not of Brand. or Bedd.* L. pubescens, *Wall. Cat.* 2841; *Pl. As. Rar.* iii. 44; *DC. Prodr.* viii. 294. L. punctatum, *Griff. Notul.* iv. 741. Phillyrea robusta, *Roxb. Hort. Beng.* 3, and *Fl. Ind. ed. Carey & Wall.* i. 101. Olea robusta, *Wall. Cat.* 2822; *Kurz For. Fl.* ii. 158, and *in Journ. As. Soc.* 1877, pt. ii. 244. Visiania robusta, *DC. l. c.* 289; *Deless. Ic. Sel.* v. t. 44. V. sumatrana, *Miq. Fl. Ind. Bat.* ii. 549.

EAST BENGAL PLAIN; Silhet, Dacca, Chittagong, &c.; abundant near the base of the hills. PEGU; *Kurz.*—DISTRIB. Birma, Malaya.

A tree, attaining 60 ft.; usually a large shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., membranous; nerves somewhat distant, difficult to count from their irregularities and interposed scarcely less distinct other nerves; petiole $\frac{1}{5}$ in. *Panicles* often 12 by 10 in., pubescent or almost villous; bracts 0; bracteoles $\frac{1}{30}$ in., linear; pedicels (in flower) 0–$\frac{1}{8}$ in., the flowers all scattered not clustered. *Corolla* small, white. *Style* long, or (fide *Griffith*) hardly any (is the species dimorphic?). *Drupe* cylindric, often curved and more or less glaucous.—Many of the species that follow are difficult to separate from this; and, when it is said that this East Bengal plains plant is not *L. robustum* of Brandis, all that is intended is that the long-fruited Silhet species (Roxburgh's type) has not been sent from the North-west Himalaya. Dr. Brandis may very probably be right in thinking plants he has seen there to be not specifically distinct.

VAR. *khasiana*; panicle smaller denser, pedicels in flower 0, drupe $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{8}$–$\frac{1}{6}$ in. very glaucous. Ligustrum sp. n. 5, *Herb. Ind. Or. H. f. & T.* Olea, n. 445, *Griff. Notul.* iv. 29.—Khasia, alt. 4000 ft.; *Griffith, H. f. & T.*, &c.—A stunted small tree, perhaps a high-level form of the plains' *L. robustum*, but appears more distinct than species admitted by authors. In Griffith's examples the fruiting panicle in *L. robustum* type is diffuse with scattered fruit, in var. *khasiana* it is close erect rigid with erect fruits and 4-angled lenticellate branches; the fruits are scarcely more than half the size of those of *L. robustum*. But the series Ligustrum, n. 5, *H. f. & T.*, includes an example gathered at Chela (alt. 1000 ft.) which is intermediate in character.

2. **L. Walkeri,** *Dcne. in Nouv. Arch. Mus.* 2, ii. 27; branches lenticellate, leaves elliptic acuminate, nerves slender irregular, panicle large compound minutely pubescent, corolla-tube hardly as long as the calyx, drupe $\frac{1}{4}$ by $\frac{1}{6}$ in. L. ceylanicum, *Dcne. in Nouv. Arch. Mus.* 2, ii. 30. L. robustum, *Thwaites Enum.* 188.

CEYLON; ascending to 5000 ft., frequent; *Walker, Thwaites* (n. 475, 494, &c.). NILGHERRIES; *Herb. Ind. Or. H. f. & T.*, n. 5, *partly.*

Very near *L. robustum*, and perhaps only the Ceylon form of it as Thwaites considered; the drupes, however, are very much shorter, broader, and somewhat obovoid, the panicle is more obscurely pubescent, the leaves rather more coriaceous. Decaisne

refers the Nilgherry portion of *Ligustrum.* n. 5, *H. f. & T.*, to his *L. confusum*, which is certainly erroneous; it is either *L. Walkeri* or closely allied thereto.

VAR. *tubiflora*; corolla-tube twice as long as the calyx. Olea Roxburghii, *Wall. Cat.* 2816 B *only.*—Deccan Peninsula; Belgaum, *Dr. Ritchie*; Herb. Heyne, *Wallich.*—Corolla-tube much slenderer than in *L. neilgherrense*, Wight; anthers exsert.—These are very doubtful plants; Ritchie's has a bracteate panicle, and subovate leaves, but the drupe is as of *L. Walkeri.*

3. **L. Roxburghii,** *Clarke*; branches lenticellate, leaves ovate-lanceolate acuminate coriaceous, panicle stout pubescent, flowers clustered, corolla-tube broad as long as the calyx, drupe $\frac{1}{3}$ by $\frac{1}{6}$ in. L. Candolleanum, *Blume Mus. Bot.* i. 315, *not of Dcne.* L. robustum, *Bedd. For. Man.* 154, *not of Blume.* L. compactum, *Dcne. in Nouv. Arch. Mus.* 2, ii. 23, *not of H. f. & T.* Olea Roxburghii, *Wall. Cat.* 2816, *not of Spreng. nor of Wight.* Visiania robusta, *Wight Ic.* t. 1242. Phillyrea terminalis, *Herb. Roxb.*

MTS. of the DECCAN PENINSULA, alt. 4–7000 ft., very common.

A small tree. *Leaves* $3\frac{1}{2}$ by $\frac{1}{2}$ in., base obtuse; nerves 8 pairs, slender but well-defined and somewhat regular; petiole $\frac{1}{5}$ in. *Panicles* often 8 by 6 in., brachiate; bracts lanceolate, foliaceous or 0; pedicels hardly any, clusters of flowers often somewhat whorled. *Corolla* $\frac{1}{5}$ in., much larger than in *L. robustum*; tube sometimes considerably exceeding the calyx.—Blume founds his species on *Wall. Cat.* 2816 E, which he (by error) supposes to have come from Nipal. Decaisne has not included Wight's icon, t. 1242, in his monograph; but he has named the specimens belonging to that picture, *L. compactum*, perhaps because of the distinct regular nervation of the leaves, which is similar. This species has been known as "the stout Nilgherry form of *L. robustum*," but it differs as much from *L. robustum* of Silhet as does any Indian *Ligustrum.* The confusion which has enveloped this species arises from its having been named by Wight *Phillyrea paniculata*, Roxb., which is = *Ligustrum lucidum*, Aiton = *Olea clavata*, Don = *O. Roxburghii*, Spreng. (Wight Ic. t. 735), a Chinese plant, cultivated both at Calcutta and in Europe, closely allied to *L. Roxburghii*, but having the panicle glabrous.

4. **L. neilgherrense,** *Wight Ic.* t. 1243, *not of Dcne.*; leaves ovate acute coriaceous, panicle dense, branches glabrous lenticellate, corolla-tube twice as long as the calyx, drupe $\frac{1}{4}$ by $\frac{1}{6}$ in. L. Candolleanum, *Dcne. in Nouv. Arch. Mus.* 2, ii. 28, *not of Blume.* Olea Roxburghii, *Wall. Cat.* 2816, E *only.*

MTS. of the DECCAN PENINSULA, frequent; Dindyghul, Nilgherries, Bababoodun Hills, &c.

United (very probably correctly) with *L. Roxburghii* by Beddome; it differs in the larger flowers (corolla-tube $\frac{1}{4}$ in.) and in the glabrous panicle, the branches of which are quadrangular lenticellate in fruit, instead of round and hairy as in *L. Roxburghii.* The leaves also are not acuminate, often subobtuse, sometimes orbicular ($2\frac{1}{2}$ by 2 in.).—Decaisne has marked a typical example of this from Herb. Wight (flower and fruit) *L. compactum*; the Kumaon *L. compactum* has a shorter corolla-tube with reflexed lobes more closely-nerved acuter leaves, and a very different-looking less rigid fruit-panicle with compressed flexuose branches.

VAR. *obovata*, Dcne. in Nouv. Arch. Mus. 2, ii. 22; leaves subobtuse, corolla rather shorter.—Mts. of the Deccan Peninsula.—Cannot be satisfactorily distinguished from *L. neilgherrense.*

5. **L. Perrottetii,** *A. DC. in DC. Prodr.* viii. 294; branches rarely lenticellate, leaves smallish elliptic acute at both ends, panicles thyrsoid minutely pubescent, corolla-tube nearly twice the calyx, drupe $\frac{1}{4}$ by $\frac{1}{6}$ in. *Wight Ic.* t. 1244; *Bedd. For. Man.* 153, and *Anal. Gen.* t. 19, fig. 5; *Dcne. in Nouv. Arch. Mus.* 2, ii. 32.

MTS. of the DECCAN PENINSULA, frequent; Nilgherries, Pulneys, *Wight*, *Gardner*, &c.

Leaves 2 by ¾ in., coriaceous; nerves 7 pairs, oblique to the midrib, slender or obscure. *Panicles* 3 by 1½ in., rigid; branches in fruit 4-angled, stout.—This differs little from *L. Roxburghii* but by the non-lenticellate branches and smaller leaves, and is placed under *L. Roxburghii* by Beddome.

6. **L. Decaisnei**, *Clarke*; branches lenticellate, leaves small elliptic acute at both ends, panicles small obscurely pubescent, corolla small tube scarcely as long as the calyx. L. neilgherrense, *Dcne. in Nouv. Arch. Mus.* 2, ii. 32, *not of Wight.* Ligustrum sp. n. 3, *Herb. Ind. Or. H. f. & T.*

NILGHERRIES.

Leaves 1½ by ⅝ in. *Panicles* 2 by 1½ in.—This appears as though a form of *L. Walkeri* with smaller leaves and panicles, but is founded on a plant once collected, the fruit unknown.

VAR. *microphylla*, Wight in Herb. (sp.); leaves 2¼ by ⅔ in. lanceolate, panicles glabrous, berry ¼ by ⅙ in.—South Deccan; Shevagherry Hills and Courtallum, *Wight*.—*L. microphyllum*, Bedd. For. Man. 154, from Coorg, is described with small leaves and pubescent panicle-branches, and is therefore perhaps nearer *L. Decaisnei* type. *L. Walkeri* only differs in its large diffuse panicles.

7. **L. compactum**, *H. f. & T.*; *Brand. For. Fl.* 310; glabrous, leaves elliptic-lanceolate, nerves 12–20 pairs subdistinct, panicle pyramidal compound, corolla-tube as long as the calyx, fruit nearly ⅓ by ⅕ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 23 (*as to the Kumaon examples*). Olea compacta, *Wall. Cat.* 2819. *DC. Prodr.* viii. 287.

TEMPERATE HIMALAYA, alt. 5000 ft.; Kumaon, *Wallich, Thomson, Strachey & Winterbottom.*

Branches sparingly (or not) lenticellate. *Leaves* 4 by 1⅓ in., acute, base cuneate or rounded, coriaceous; petiole ⅓ in. *Panicles* 4 in. long and broad; bracts 0; bracteoles minute; flowers clustered, subsessile. *Corolla-tube* very short; lobes reflexed, or sometimes corolla-tube considerably exceeding the calyx. *Panicle* dense with fruit; branches compressed, flexuose. *Drupe* often curved.

8. **L. Massalongianum**, *Vis. Pl. Nov. Orto Padova*, 27, t. 4; leaves linear-lanceolate, panicles small dense very hairy, corolla-tube narrow twice as long as the calyx, drupe ¼ by ⅛ in. *Dcne. in Nouv. Arch. Mus.* 2, ii. 19. Olea robusta, γ. angustifolia, *Wall. Cat.* 2822. Ligustrum n. 8, *Herb. Ind. Or. H. f. & T.*

KHASIA; alt. 3–5000 ft., *Wallich, H. f. & T.*, &c.

A small shrub; branchlets lenticellate, densely leafy. *Leaves* 3 by ⅓ in., tapering at each end, coriaceous; nerves few, distant; petiole ⅙ in. *Panicles* 1–2 in.; bracts ⅓ in., linear, caducous; bracteoles inconspicuous; flowers clustered, subsessile, small. *Berry* glaucous, exceedingly like that of *L. robustum*, var. *khasiana*, of which this may be a narrow-leaved form.

VAR. *Lindleyi*; leaves 1 in. lanceolate, corolla-tube hardly longer than the calyx, style short, drupe ⅙ in. broad. L. robustum, *Wall. Cat.* 2822, γ *only*. Olea Lindleyi, *Wall. Cat.* 6305; *DC. Prodr.* viii. 288. Ligustrum sp., n. 1175, *Griff. Itin. Notes*, 81.—Khasia, alt. 3–4000 ft.; *Griffith, H. f. & T.*, &c.—Perrottet's Nilgherry plant referred here by Decaisne was perhaps *L. Decaisnei*, var. *microphylla*.

** *Drupe globose.*

9. **L. confusum**, *Dcne. in Nouv. Arch. Mus.* 2, ii. 24; branches lenticellate, leaves elliptic-lanceolate, panicles pubescent bractless, flowers clustered subsessile, corolla-tube as long as the calyx, berry ⅕ in. diam. L. robustum, *Wall. Cat.* 2822, β *only*. Ligustrum sp., nn. 1247, 408, 1247, *Griff. Itin. Notes*, pp. 86, 123, 157. Ligustrum n. 9, *Herb. Ind. Or. H. f. & T.*

SIKKIM; Lachen and Lachoong, *J. D. H.*; Kulhait, alt. 5000 ft., *Clarke.* BHOTAN; alt. 5500 ft, *Griffith.* KHASIA, alt. 3–5000 ft., common, *Griffith, H. f. & T.*, &c.

A small tree; sometimes 40 ft. in Sikkim. *Leaves* 3½ by ¾ in., usually obtuse or rounded at the base, coriaceous; nerves slender or distinct; petiole ⅙ in. *Panicles* 1–5 in.; bracts 0 or linear, caducous; bracteoles minute. *Corolla* ⅛ in., wider than in *L. robustum.*—This previous to Decaisne's memoir, was confounded with *L. robustum* which (except as to the fruit) it greatly resembles. In flower it differs from the Bengal typical *L. robustum* in the more obtusely-based leaves, the sessile crowded flowers, and the broader corolla. It only differs from *L. spicatum* in the absence of persistent leaflike bracts in the panicle. Simons' specimen is named *L. compactum* by Decaisne, but it has a pubescent panicle, and the leaves do not show the prominent numerous nerves characteristic of *L. compactum.*

VAR. *macrocarpa*; berry ⅓ in. diam. and upwards. Khasia; Nunklao, alt. 4000 ft., *Clarke.*

10. **L. nepalense,** *Wall. Cat.* 2830, and *in Roxb. Fl. Ind. ed. Carey & Wall.* i. 150, and *Pl. As. Rar.* iii. 44, t. 270; branches lenticellate, leaves elliptic-lanceolate, panicles large pubescent, bracts leaflike coriaceous persistent, flowers clustered sessile, corolla-tube as long as the calyx, drupe ⅕ in. diam. *DC. Prodr.* viii. 294, *excl. var. β*; *Dcne. in Nouv. Arch. Mus.* 2, ii. 26. L. spicatum, *Ham.*; *Don Prodr.* 107; *Loud. Arb. Brit.* 630, t. 1220. L. bracteolatum, *Don Prodr.* 107; *DC. l. c.*; *Brand. For. Fl.* 310; *Dcne. l. c.* 34. L. Wallichii, *Blume Mus. Bot.* i. 315; *Dcne. l. c.* 29. L. parviflorum, *Visiani*; *Dcne. in Nouv. Arch. Mus.* 2, ii. 26. L. kumaonense, *Dcne. l. c.* 28. Olea grandiflora, *Wall. Cat.* 2820. Visiania grandiflora, *DC. l. c.* 289.

TEMPERATE HIMALAYA, alt. 4–7000 ft.; Gurwhal to Nipal, frequent.

Only separable from *L. confusum* by the bracts interspersed among the panicle branches being petiolate, often 1½ by ⅓ in., coriaceous, persistent. The type examples of *L. nepalense* and *grandiflorum* in herb. Wallich, and of *L. kumaonense* in herb. Strach. & Winterb. all exhibit these bracts, which are not seen in the Khasian *L. confusum.*—*L. nepalense, β* var. *glabra* (Bot. Mag. t. 2921), is *L. lucidum*, and received from the Calcutta garden, it is not an Indian plant.

VAR. *vestita*, Wall. Cat. 6304 (sp.); leaves villous beneath. *DC. Prodr.* viii. 294. —Nipal.

11. **L. Myrsinites,** *Dcne. in Nouv. Arch. Mus.* 2, ii. 33; leaves small elliptic, racemes small few-flowered nearly glabrous, drupe scarcely ⅙ in. diam. L. Uva-ursi, *Dcne. l. c.* 34. Ligustrum n. 10, *Herb. Ind. Or. H. f. & T.*

KHASIA, alt. 4–5000 ft.; Mairung, *Griffith* (Kew Distrib. n. 3683); Moflong, Moleem and Upper Kalapani, *J. D. H.*, *Simons.*

A small ramous shrub; branchlets hairy. *Leaves* ½–⅔ by ¼–½ in., glabrous, coriaceous; nerves obscure; petiole ⅛ in. *Panicles* (nearly always reduced to racemes) 3–10-flowered, less than ½ in. diam. in flower; rhachis verrucose hardly hairy; flowers sessile; in the penultimate axils are often added solitary short-pedicelled flowers (or raceme with foliaceous bracts in its lower part). *Corolla* ⅙ in., tube a little longer than the calyx.

10. MYXOPYRUM, *Blume.*

Large scandent shrubs; branches 4-angular. *Leaves* opposite, large, coriaceous, 3-nerved, entire or toothed. *Flowers* small, yellowish, numerous in axillary and terminal trichotomous panicles; bracts minute or 0. *Calyx* acutely 4-lobed. *Corolla-tube* longer than the calyx; lobes 4, concave, oblong or spathulate, induplicate-valvate in bud. *Stamens* 2, on the corolla-tube, filaments short; anthers ovate. *Ovary* 2-celled; style hardly any, stigma 2-lobed; ovules 1–2 in each cell, attached near the base at the inner angle (anatropal, *fide*

Blume). *Fruit* 1-seeded globose, or sometimes 2-seeded obovoid; pericarp crustaceous. *Testa* thin, albumen horny; radicle inferior.—DISTRIB. Species 3, East Himalaya to South Madras and Malaya.

1. **M. smilacifolium,** *Blume Mus. Bot.* i. 320; leaves ovate or oblong acute entire or toothed, fruit $\frac{1}{3}$ in. diam. *Kurz For. Fl.* ii. 160, and *in Journ. As. Soc.* 1877, pt. ii. 245. Ligustrum laurifolium, *Roxb. Hort. Beng.* 3. Chionanthus ? smilacifolia, *Wall. in Roxb. Fl. Ind. ed. Carey & Wall.* i. 108. Chondrospermum smilacifolium, *Wall. Cat.* 2837; *Wight Ill.* t. 151, b. D; *DC. Prodr.* viii. 301. Ch. coriaceum, *Wall. Cat.* 2838; *DC. l. c.*

SIKKIM TERAI; *J. D. H.* ASSAM, SILHET, CACHAR, CHITTAGONG, PEGU, PENANG. SOUTH DECCAN PENINSULA; Anamallay Mts., *Beddome.*—DISTRIB. Malaya, Admiralty Islands.

Nearly glabrous. *Leaves* 6–9 in., from narrow-oblong to cordate-ovate, acuminate, base cuneate or rounded, entire slightly toothed or closely serrate on the same branch; petiole $\frac{1}{2}$ in. *Panicles* 4–8 in., peduncled; branches somewhat lax in fruit. *Corolla* $\frac{1}{6}$ in.

2. **M. nervosum,** *Blume Bijd.* 683; *Mus. Bot.* i. 320. t. 51; leaves oblong or elliptic acute entire or toothed, berries $\frac{2}{3}$ in. diam. *DC. Prodr.* viii. 290.

MALACCA; *Maingay.*—DISTRIB. Sumatra, Java.

Leaves 8 by $3\frac{1}{2}$ in., base cuneate or rounded, very coriaceous. *Panicles* minutely pubescent in flower, very rigid, brachiate in fruit.—Maingay's plant here described differs from *M. smilacifolium*, only in its very stout habit and large berries. Whether it is Blume's *M. nervosum* is uncertain, as that has no ripe fruit.

ORDER XCIII. SALVADORACEÆ. (By C. B. Clarke.)

Trees or shrubs, nearly glabrous, olive-grey, unarmed or spinous. *Leaves* opposite, entire. *Flowers* clustered or panicled, small, diœcious or polygamo-dimorphic. *Calyx* free, campanulate or ovoid, 3–5-fid. *Corolla* shortly campanulate or petals free, 4-merous, imbricate in bud. *Stamens* 4, on the corolla-tube or hypogynous, alternate with the corolla-segments; filaments free or connate into a tube. *Ovary* free, 1–2-, or imperfectly 4-celled; style short, stigma 2-fid or subentire; ovules 1–2 in each cell, erect from its base, anatropous. *Berry* or *drupe* mostly 1-seeded. *Seed* erect, globose, exalbuminous.—DISTRIB. Species 8–9, in tropical and subtropical Asia, Africa, Madagascar and Malaya.

Distinguished from the Indian species of *Oleaceæ* by their 4 stamens.

Petals free. Stamens monadelphous. Ovary 1-celled, 1-ovuled . 1. DOBERA.
Corolla gamopetalous. Stamens on corolla-tube. Ovary 1-celled, 1-ovuled . . . . 2. SALVADORA.
Petals free. Stamens free. Ovary 2- (or falsely 4-) celled . . . 3. AZIMA.

1. DOBERA, *Juss.*

A glabrous tree. *Leaves* opposite, entire. *Flowers* small, polygamo-diœcious, clustered on the branches of an axillary inflorescence, trichotomous in the males, subsimple in the females. *Calyx* ovoid, irregularly valvate, 3–5-toothed. *Petals* 4 (or 5), narrowly-oblong, free, imbricate. *Stamens* 4 (or 5), filaments connate into a tube; anthers lanceolate, dehiscing laterally or subextrorsely. *Scales* 4–5 outside the staminal tube, alternate with the stamens. *Ovary* 1-celled (*Bth. &*

Hk.), 4-5-celled (*Hochst.*), 2-celled (*Forsk.*); style short, stigma obtuse undivided (*Bth. & Hk.*), 2-fid (*Forsk.*); ovule solitary, erect (*Bth. & Hk.*). *Fruit* subglobose. *Seed* erect, globose, exalbuminous.

The true place of this disputed genus cannot be settled until material is received which shall decide the structure of the young ovary. The younger flowers at Kew appear all male (or functionally male); in these the imperfect style is obscurely 2-lobed, and the ovary seems 2-celled as Forsk. states. From Hochstetter's description it seems probable that he had very young fruit containing one 1-seeded cell and traces of other abortive cells. As he tried to make the order of the tree *Meliaceæ*, he may have over-counted the abortive cell.

D. Roxburghii, *Planch. in Ann. Sc. Nat.* 3, x. 191. D. coriacea *and* glabra, *A. DC. Prodr.* xvii. 31. Tomex glabra, *Forsk. Fl. Ægypt-Arab.* 32. Schizocalyx coriaceus, *Hochst. in Flora*, 1844, *Beil.* 2. Blackburnia oppositifolia (*error for* B. monadelpha), *Roxb. Fl. Ind. ed. Carey & Wall.* i. 435, *fide Planch. l. c.*

BOMBAY; *Capt. Geburne.*—DISTRIB. Arabia, Abyssinia.

A fine tree (*Hochst.*). *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., elliptic, acute, mucronate or obovate-obtuse (on the same branch in the Indian specimen), coriaceous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Panicles* $1\frac{1}{2}$–3 in.; bracts 0; bracteoles $\frac{1}{30}$ in., ovate, close to the calyx. *Calyx* $\frac{1}{10}$ in., ovate-cylindric, subspathaceous; teeth usually 5, one much broader. *Petals* $\frac{1}{5}$ in., white, free, 4 in the Indian plant, but placed slightly unsymmetrically, sometimes 5 in the African (*Hochst.*). *Stamens* 4 in the Indian specimen (sometimes 5 in the African), filaments united for two-thirds their length into a subquadrangular tube. *Berry* $\frac{3}{4}$ in. diam.; endocarp crustaceous.—There is no *Blackburnia oppositifolia*, Roxb. Planchon no doubt meant *B. monadelpha*, Roxb., with which the description fairly agrees.

2. SALVADORA, *Linn.*

Shrubs or trees. *Leaves* opposite, entire. *Flowers* small, hermaphrodite or (mostly) functionally unisexual, racemose or spicate on the branches of terminal or axillary panicles; bracts minute. *Calyx* campanulate; lobes 4, imbricate. *Corolla* campanulate; tube with 4 small teeth (sometimes subobsolete) between the bases of the filaments; lobes 4, imbricate. *Stamens* 4, on the corolla, alternate with its lobes. *Ovary* 1-celled; style 0, stigma truncate; ovule 1, erect basal. *Drupe* globose, supported by the slightly enlarged calyx, and subpersistent corolla; endocarp crustaceous. *Seed* erect, globose, exalbuminous.—DISTRIB. Species 2; Eastern Africa, Arabia and India.

1. **S. persica,** *Linn.*; *A. DC. Prodr.* xvii. 28; glabrous, leaves ovate or oblong obtuse, panicles axillary or terminal compound, flowers pedicelled, drupes scattered. *Vahl Symb.* i. 12, t. 4; *Lamk. Ill.* t. 81; *Roxb. Cor. Pl.* i. 26, t. 26, and *Fl. Ind. ed. Carey & Wall.* i. 404; *Wall. Cat.* 1042; *Lemaout & Dcne. Traité Bot.* 453, *with fig.*; *Dalz. & Gibs. Bomb. Fl.* 312; *Baill. in Adans.* ix. 289, t. 10, fig. 4–8; *Brand. For. Fl.* 315; *Boiss. Fl. Orient.* iv. 43. S. Wightiana, *Planch.*; *Thwaites Enum.* 190; *Bedd. Fl. Sylv.* t. 247. S. indica, *Wight Ill.* ii. 229, t. 181. Cissus arborea, *Forsk. Fl. Ægypt-Arab.* 32. Embelia Grossularia, *Retz Obs.* iv. 24.

INDIA, alt. 0–1500 ft., in the drier climates; from the Punjab and Scinde to Patna; and in the Circars and North Ceylon; often planted elsewhere.—DISTRIB. Arabia, Syria, E. Africa.

A small, glaucous tree *Leaves* $1\frac{3}{4}$ by $\frac{3}{4}$ in., somewhat fleshy; petiole $\frac{1}{3}$ in. *Panicles* 2–5 in., often very compound, numerous in the upper axils; flowers scattered. *Calyx* $\frac{1}{20}$ in., lobes ovate. *Corolla* $\frac{1}{10}$ in., almost 5-partite. *Filaments* short, anthers ovate. *Drupe* $\frac{1}{8}$ in. diam.

2. **S. oleoides,** *Dcne. in Jacquem. Voy. Bot.* 140, t. 144; glabrous, leaves narrowly lanceolate acute, panicles mostly reduced to axillary fascicles of short spikes, drupes clustered. *A. DC. Prodr.* xvii. 28; *Brand. For. Fl.* 316, t. 39. S. Stocksii, *Wight Ill.* ii. 229, and *Ic.* t. 1621. S. indica, *Royle Ill.* 319. S. persica, *T. And. in Journ. Linn. Soc.* v. *Suppl.* i. 29.

PUNJAB and SCINDE, in the plains; frequent.—DISTRIB. Aden.

Leaves 2 by $\frac{1}{3}$ in.; petiole $\frac{1}{6}$ in. *Panicles* many, axillary, mostly of sessile clustered spikes 1–1$\frac{1}{2}$ in.; rhachises after the flowers have dropped rough from the crowded scars. *Drupes* $\frac{1}{6}$ in., subsessile, often touching each other. Closely allied to the preceding species, but well distinguished by Brandis. Wight's *S. Stocksii* is figured from a flowering example which has the panicles rather more compound than usual.

EXCLUDED SPECIES.

SALVADORA, *Wall. Cat.* 7530, is *Olax nana*, but there is a loose sheet without locality, date or name numbered also 7530, which is *Salvadora oleoides.*

3. AZIMA, *Lamk.*

Rambling shrubs, with axillary spines. *Leaves* opposite, entire *Flowers* small, diœcious, axillary, sessile, or on a little-branched panicle in clusters or umbels; bracts 0 or leaflike; bracteoles linear, small. *Calyx* campanulate, 4-fid or irregularly 2–4-lobed. *Petals* 4, oblong, imbricate in bud. *Stamens* 4, alternate with the petals, hypogynous, filaments linear; anthers ovate. *Ovary* 2-celled; stigma subsessile, large, 2-fid; ovules 2–1 in each cell, erect, basal. *Berry* globose, 2–1-seeded, endocarp membranous. *Seed* globose, exalbuminous. —DISTRIB. Species 3–4, in Trop. and S. Africa and Asia.

1. **A. tetracantha,** *Lamk. Dict.* i. 343, and *Ill.* t. 807; rigid, leaves elliptic acute, flowers axillary clustered, calyx minutely hairy, berries sessile. *Wight & Gardn. in Calc. Journ. Nat. Hist.* vi. 49–55, t. 1; *Wight Ill.* ii. t. 152; *Dalz. & Gibs. Bomb. Fl.* 143. Monetia barlerioides, *L'Hérit. Stirp. Nov.* i. t. 1; *Gaertn. Fruct.* t. 225; *Roxb. Fl. Ind.* iii. 765; *Wall. Cat.* 7492. Fagonia montana, *Miq. in Pl. Hohenack.* n. 761.

DECCAN PENINSULA and CEYLON; "one of the commonest shrubs of Coromandel, growing in all situations;" *Roxburgh,* &c.—DISTRIB. S. and Subtrop. Africa and Madagascar.

Glabrous, or branchlets hairy. *Leaves* 1$\frac{1}{2}$ by $\frac{3}{4}$ in., mucronate or spinescent, base cuneate, glabrous, rigid; petiole $\frac{1}{8}$ in; spines $\frac{1}{4}$–$\frac{3}{4}$ in., 1–2 in each axil. *Flowers* in axillary clusters scarcely $\frac{1}{2}$ in. diam.; upper leaves often reduced or obsolete, so that the branches end in naked spikes on which the flowers are whorled. *Calyx* $\frac{1}{10}$ in. *Petals* $\frac{1}{6}$ in. *Ovary* 2-celled; cells 2-ovulate, or (ex Wight & Gardner) more often 1-ovulate. *Berry* $\frac{1}{4}$ in. diam., usually 1-seeded.

2. **A. sarmentosa,** *Benth. in Gen. Pl.* ii. 681; rambling, leaves ovate obtuse mucronate, flowers panicled, calyx glabrous, berries pedicelled. Actegeton sarmentosa, *Blume Bijd.* 1143; *A. DC. Prodr.* xvii. 30. Monetia Brunoniana, *Wall. Cat.* 7493. M. laxa, *Planch. in Ann. Sc. Nat.* 3, x. 191. M. sarmentosa, *Baill. in Adans.* ix. 289, t. 10, fig. 1–3. Salvadora Madurensis, *Dcne. in Jacquem Voy. Bot.* 140.

PROME; *Kurz* (n. 3036).—DISTRIB. Birma, Malaya, Philippines.

Branchlets glabrous. *Leaves* 2$\frac{1}{2}$ by 1$\frac{1}{2}$ in., broadly ovate, base obtuse, rigid, glabrous; petiole $\frac{1}{8}$ in.; axillary spines $\frac{1}{4}$ in., 2 in each axil. *Panicles* axillary, in fruit 1–3 in.; bracts minute; pedicels in fruit 0–$\frac{1}{3}$ in. *Flowers* as of *A. tetracantha. Ovary* imperfectly 4-celled, 4-ovuled. *Berry* $\frac{1}{4}$ in. diam.

ORDER XCIV. **APOCYNACEÆ.** (By J. D. Hooker.)

Erect or twining shrubs, rarely herbs or trees. *Leaves* opposite or whorled (scattered in *Cerbera* and *Plumeria*), quite entire, exstipulate. *Flowers* in terminal or axillary cymes, hermaphrodite, regular. *Calyx* inferior; lobes 5, rarely 4, imbricate, often glandular within at the base. *Corolla* rotate or salver-shaped; lobes 5, rarely 4, spreading, contorted and often twisted in bud, very rarely valvate. *Stamens* 5, rarely 4, on the tube throat or mouth of the corolla, filaments usually short; anthers oblong linear or sagittate, conniving, connective sometimes adhering to the stigma; cells 2, dehiscing lengthwise, sometimes produced downwards into an empty spur; pollen granular. *Disk* annular, cupular or lobed, or of glands, or 0, sometimes concealing the ovary. *Ovary* 1-celled with 2-parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels; style simple or divided at the base only; top thickened; stigma 2-fid, acute or obtuse. *Ovules* in each cell 2, or few or many and 2–∞-seriate, rarely solitary. *Fruit* a dry or fleshy drupe, berry, or samara, or of 2 drupes, berries or follicles. *Seeds* various, often winged, or with a terminal pencil of long silky hairs (*Coma*); albumen hard fleshy, or scanty or 0; embryo straight, cotyledons flat, concave, convolute or contorted, radicle usually superior.—DISTRIB. Species about 900, chiefly tropical.

TRIBE I. **Carisseæ.** *Anthers* included, free from the stigma; cells rounded at the base. *Ovary* of 2 wholly combined carpels, 1–2-celled. *Fruit* large, usually fleshy or pulpy within. *Seeds* without wing or pencil of hairs. *Corolla-lobes* overlapping to the left in all.

* *Ovary 1-celled, with parietal ovules.*

Fruit indehiscent. Albumen 0 . . . . 1. WILLOUGHBEIA.
Fruit 2-valved. Albumen horny . . . . 2. CHILOCARPUS.

** *Ovary 2-celled, with axile ovules.*

Flowers 4-merous. Erect shrubs. Seeds exalbuminous . 3. LEUCONOTIS.
Climbing shrubs. Corolla-mouth with lobed scales . . . 4. MELODINUS.
Climbing slender unarmed shrub. Corolla-mouth naked . 5. WINCHIA.
Erect or stout climbing armed shrubs . . . . 6. CARISSA.

TRIBE II. **Plumerieæ.** *Anthers* included, free from the stigma, cells rounded at the base. *Ovary* of 2 distinct carpels united by the style. *Fruit* various. *Seeds* peltate. *Corolla-lobes* overlapping to the left except in *Ochrosia*.

SUBTRIBE 1. **Rauwolfieæ.** *Calyx* eglandular within. *Carpels* 1–2-, rarely 4–6-ovuled. *Fruit* of 2 1-seeded drupes or berries, rarely moniliform (of superposed drupes).

Leaves usually whorled. Disc present. Albumen even . 7. RAUWOLFIA.
Leaves usually whorled. Disc 0. Albumen ruminate . . 8. ALYXIA.
Leaves opposite. Disc 0. Albumen smooth . . . . . . 9. HUNTERIA.

SUBTRIBE 2. **Cerbereæ.** *Calyx* glandular within. *Carpels* 2-, rarely 4-ovuled; ovules on opposite sides of a thick placenta. *Drupes* or berries 1-seeded, or 2-seeded, the seeds separated by the enlarged placenta.

Leaves scattered, alternate. Corolla funnel-shaped . . . 10. CERBERA.
Leaves opposite. Corolla salver-shaped, lobes overlapping to the right . . . . 11. OCHROSIA.
Leaves opposite. Corolla salver-shaped . . . . 12. KOPSIA.

SUBTRIBE 3. **Euplumerieæ.** *Calyx* glandular within. *Carpels* 6–∞-ovuled. *Fruit* (in the Indian genera) of 2 follicles.

* *Ovules 2-seriate.*

Disc annular or obscure. Seeds winged. Leafless shrub . 13. RHAZYA.
Disc of 2 scales. Seeds truncate at both ends . . . . 14. VINCA.

** *Ovules ∞-seriate.*

Erect trees. Leaves scattered, alternate. Seeds winged . 14*. PLUMERIA.
A climber. Leaves opposite or whorled . Seeds winged . 15. ELLERTONIA.
Erect trees or shrubs. Leaves whorled. Seeds comose. Style distinct . . . . 16. ALSTONIA.
Erect trees. Leaves whorled. Seeds winged. Style 0 . . 17. DYERA.
Erect trees. Leaves opposite. Seeds comose. Style short 18. HOLARRHENA.

SUBTRIBE 4. **Tabernæmontaneæ.** *Calyx* glandular within. *Carpels* ∞-ovuled. *Fruit* fleshy or coriaceous, dehiscent or not.

Erect trees or shrubs . . . . 19. TABERNÆMONTANA.

TRIBE III. **Echitideæ.** *Anthers* included or exserted, conniving in a cone around the top of the style and adherent to it by a point on the connective; cells produced downwards into a subulate empty spur. *Ovary* of 2 distinct carpels united by the style. *Fruit* of 2 follicles. *Seeds* comose at one or both ends.—Exceptions, see *Parsonsia.*

SUBTRIBE 1. **Parsonsieæ.** *Corolla* rotate or salver-shaped, throat naked, except *Wrightia.* *Anthers* more or less exserted.

Corolla-lobes valvate. Carpels *connate in flower* . . . . 20. PARSONSIA.
Corolla rotate, mouth naked. Connective thickened at the back . . . . 21. VALLARIS.
Corolla salver-shaped, mouth naked . . . . 22. POTTSIA.
Corolla rotate or salver-shaped, mouth with scales . . . 23. WRIGHTIA.

SUBTRIBE 2. **Nerieæ.** *Corolla-throat* broad, with 5–10 scales. *Anthers* included.

Shrubby, erect. Leaves whorled. Corolla-lobes short. Follicles erect . . . . 24. NERIUM.
Shrubby or twining. Leaves opposite. Corolla-lobes long or tailed. Follicles spreading . . . . 25. STROPHANTHUS.
Herbaceous. Leaves opposite. Corolla-lobes short. Follicles slender . . . . 26. APOCYNUM.

SUBTRIBE 3. **Euechitideæ.** *Corolla* various, mouth naked. *Anthers* included.

* *Corolla-lobes valvate, overlapping to the left.*

Flowers small or minute. Corolla urceolate, lobes valvate 27. URCEOLA.
Flowers small. Corolla subcampanulate, lobes overlapping 28. PARAMERIA.

** *Corolla-lobes overlapping to the right.*

a. Corolla very large.

Immense climbers, corolla bell- or funnel-shaped . . . . 29. BEAUMONTIA.
Lofty climbers. Corolla salver-shaped . . . . 30. CHONEMORPHA.

β. Corolla minute, urceolate, lobes very short.

Ovary exserted from the disc. Seeds beaked . . . . . . 31. ECDYSANTHERA.

γ. *Corolla small or medium-sized, salver-shaped, lobes nearly straight or slightly twisted to the left in bud.*

Ovary hidden in the disc. Seeds slender . . . . 32. BAISSEA.
Ovary hidden or not in the disc. Seeds ovate or oblong . 33. AGANOSMA.

δ. *Corolla small, salver-shaped, lobes sharply twisted to the left in bud, tips not deflected.*

Ovary hidden in the disc. Seeds slender . . . . 34. EPIGYNUM.
Ovary exserted from the disc. Seeds beaked . . . . . . 35. RHYNCHODIA.
Ovary exserted from the disc. Seeds not beaked . . . . 36. TRACHELOSPERMUM.
Ovary hidden in the disc. Seeds ovate, beaked . . . . 37. ANODENDRON.

ε. *Corolla small, salver-shaped, lobes sharply twisted to the left in bud, with the tips deflected.*

Seeds ovate, beaked . . . . 38. ICHNOCARPUS.
Seeds ovate, not beaked . . . . 39. MICRECHITES.

TRIBE I. **CARISSEÆ.**

1. **WILLOUGHBEIA,** *Roxb.*

Glabrous shrubs, often climbing by the peduncles becoming tendrils. *Leaves* opposite, petiole short. *Flowers* in axillary cymes. *Calyx* short, 5-lobed. *Corolla* salver-shaped, tube nearly glabrous within, mouth naked or with fleshy glands alternating with the lobes; lobes overlapping to the left, nearly straight in bud. *Stamens* included in the tube, and filaments very short; anthers ovate or lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 1-celled; style short, top obconic or urceolate, stigma curved or columnar; ovules many, ∞-seriate on 2 parietal placentas. *Berry* large, globose or ovoid, many-seeded, pericarp hard. *Seeds* imbedded in pulp, ellipsoid, albumen 0; cotyledon thick, plano-convex.—DISTRIB. Species 8–10, Malayan and East Asiatic.—All supposed to yield Caoutchouc.

The species with glands on the corolla-mouth may form a different genus. I have seen no tendrils on these.

* *Mouth of corolla naked.*

1. **W. coriacea,** *Wall. Cat.* 1620, and *Pl. As. Rar.* iii. 45; glabrous, leaves elliptic or elliptic-lanceolate subacute or obtusely acuminate thickly coriaceous very shining above, base acute, nerves 8–14 pairs strong arched interspaces not reticulated, corolla-lobes linear-oblong longer than the globose tube. *A. DC. Prodr.* viii. 321.

SINGAPORE; *Wallich, Lobb.* MALACCA; *Griffith, Maingay* (Kew Distrib. 1048).
Branches stout, bark black; tendrils slender, branched. *Leaves* 4–5 by 1–2½ in., drying greenish above and red beneath, very smooth, secondary nerves very faint; petiole stout, ¼–⅓ in. *Flowers* densely crowded, sessile in sessile cymes, ⅓ in. long; bracts persistent. *Calyx* very thick, subhemispheric; lobes short, rounded, ciliolate. *Corolla* thickly coriaceous, lobes twice as long as the tube. *Ovary* broad, acute; style short, top obovoid, stigma conical. *Seeds* ¾ in. long.

2. **W. edulis,** *Roxb. Cor. Pl.* iii. t. 280, and *Fl. Ind.* ii. 57; glabrous, leaves oblong or obovate-oblong obtusely acuminate or caudate thinly coriaceous, base acute, nerves many pairs nearly straight ascending interspaces reticulated, corolla-lobes linear-oblong longer than the subcylindric tube. *Wall. Cat.* 1618,

and *Pl. As. Rar.* iii. 45; *A. DC. Prodr.* viii. 321; *Kurz For. Fl.* ii. 165. W. martabanica, *Wall. Cat.* 1619, and *Pl. As. Rar.* iii. 45, t. 272; *A. DC. l. c.*; *Kurz l. c.* Hunteria?, *Wall. Cat.* 9066. Pacourea Gudara, *Herb. Ham.*; *Wall. Cat.* 4465.

ASSAM; at Gualpara, *Hamilton.* SILHET; *De Silva.* CACHAR; *Keenan.* CHITTAGONG; *Roxburgh*, &c. PEGU; *McClelland.* MARTABAN; *Wallich.* MALACCA; *Griffith.*—DISTRIB. Borneo.

"An immense climber; tendrils long, branched; bark ⅕ in. thick" (*Roxburgh*). *Leaves* 4–7 by 1½–2½ in., greenish or brown when dry and polished above, paler beneath, margins waved; petiole ½–¾ in. *Cymes* shortly stoutly peduncled, few-fld.; bracts rounded, deciduous; pedicels very short. *Calyx* thick, subglobose; lobes short, rounded, ciliolate. *Corolla-tube* ⅙ in., inflated in the middle, lobes three times as long. *Anthers* subsagittate; filaments short. *Ovary* ovoid, acute; style very short, stigma conical. *Berry* "size of a lemon, subovoid, rind thick smooth friable. *Seeds* many in soft pulp mixed with cottony fibres, size of a garden bean; outer coat fleshy, inner thin friable," *Roxb.*—Yields much caoutchouc. Fruit edible. Kurz, who keeps *W. edulis* distinct from *W. martabanica*, gives no other characters than "berry ovate smooth" in the former, and "berry globular wrinkled in the latter."—Assuming the usual variety in the size and form of such fruits in *Apocynaceæ*, and attributing the wrinkles to age, nothing is left whereby to distinguish these plants, of which the specimens in Wallich's Herbarium are identical.

3. **W. ceylanica,** *Thwaites Enum.* 191; glabrous, leaves elliptic obtusely acuminate base acute margins waved, nerves very many pairs horizontal interspaces reticulated, cymes sessile or peduncled, corolla-lobes linear-oblong much longer than the tube. *Beddome For. Fl., Anal. Gen.* xx. fig. 4. Chilocarpus ceylanicus, *Wight Ic.* t. 1288. Winchia cirrhifera, *Gardner ms.*

CEYLON; in forests ascending to 4000 ft., *Gardner*, &c.

A climbing shrub with long branched tendrils, bark of branches black. *Leaves* 3–4 by 1½–2 in., very coriaceous, when dry very dark brown and polished above, light red-brown beneath, nerves straight, with a recurrent one from the intramarginal between every pair of primaries; petiole ⅓ in. *Cymes* usually peduncled, few or many-fld.; bracts ovate, obtuse; pedicels short. *Calyx* small, lobes short rounded, ciliolate. *Corolla-tube* very short, lobes three times as long. *Anthers* lanceolate, filaments nearly as long, very broad and fleshy at the base. *Ovary* very broad, depressed-flagon-shaped; style rather slender, stigma elongate, obpyriform. *Fruit* "4–5 in. diam., spherical or subpyriform, fleshy, yellow-red. *Seeds* ¾ by ½ in., oblong, compressed, testa membranous, cotyledons fleshy, reddish," *Thwaites.*

4. **W. firma,** *Blume Mus. Bot.* i. 154; glabrous, leaves elliptic or elliptic-lanceolate very coriaceous shining above obtusely acuminate base acute, nerves 10–15 pairs nearly straight interspaces hardly reticulated, cymes sessile dense-flowered, corolla-lobes linear-oblong longer than the inflated tube, berry pyriform. *Miquel Fl. Ind. Bat.* ii. 390. W. Burbidgei, *Dyer in Kew Gard. Rep.* 1880, 44, 46.

SINGAPORE; jungles near the Botanical Gardens, *H. Murton.*—DISTRIB. Sumatra, Borneo.

A large climber; branches stout, obtusely angled, bark smooth. *Leaves* very variable, 3–6 by 1–3 in., very coriaceous, usually dark brown and polished above, or on both surfaces when dry; midrib very stout beneath; nerves slender but prominent, reticulations very indistinct. *Flowers* about ¼ in. long *Calyx-lobes* ovate, obtuse, obscurely ciliate. *Corolla-tube* inflated in the middle; lobes narrow. *Anthers* ovate, acute, filaments short. *Ovary* ovoid, acute; style short. *Fruit* in Bornean specimens as large and of the form of a good sized pear, 4 inches long, orange-yellow, pericarp thick. *Seeds* 1 in. long.—There may be more than one species under this name. The Javan specimens referred to it by Miquel have much fewer nerves in the

leaf. Burbidge has made in Borneo excellent drawings of the whole plant in flower and fruit. In both Singapore and Borneo it is said to yield the "Gutta Singarip."

5. **W. grandiflora,** *Dyer in Herb. Kew.*; quite glabrous, leaves elliptic or orbicular tip and base rounded very thickly coriaceous pale, nerves 4–7 pairs very strong arching interspaces with distant reticulations, cymes densely many-fld., corolla-lobes very large oblong much longer than the slender tube.

MALACCA; *Maingay* (Kew Distrib. 1047).—DISTRIB. Borneo.

A very stout climber, with woody tendrils, branches as thick as a goose-quill. *Leaves* 3–5 by 3–3½ in., very pale yellowish-red and rather shining above when dry, beneath cinnamon coloured and soft to the touch, with midrib and nerves very distinct but not prominent; petiole stout, ½–1 in. *Cymes* very dense-fld.; flowers shortly and stoutly pedicelled. *Calyx* broad, lobes rounded. *Corolla* nearly 1 in. long before expansion, tube ½ in., very slender, swollen towards the base, lobes ¾–1 in. long, tip rounded. *Anthers* lanceolate, base cordate, filaments slender. *Ovary* minute, broadly conical; style very short, base conical, top urn-shaped; stigma slender, as long as the style.

6. **W. tenuiflora,** *Dyer in Herb. Kew.*; shoots and cymes pubescent, leaves elliptic-oblong or oblanceolate obtusely acuminate base acute, nerves 20–30 pairs very slender nearly horizontal interspaces nerveless, petiole slender.

MALACCA; *Maingay* (Kew Distrib. 1049).

Branches with black bark. *Leaves* 3–4 by 1–1½ in., thinly coriaceous, dark brown and hardly shining above when dry, pale brighter brown beneath but without reticulations between the nerves, margins flat; petiole ½–¾ in. *Cymes* numerous, rusty puberulous, subsessile, dense-flowered; bracts small, rounded. *Calyx-lobes* rounded. *Corolla-tube* ⅓ in. long, slender, hairy within, globose near the base just above the calyx; lobes narrowly linear-oblong, obtuse. *Anthers* cordate-lanceolate, filaments short slender. *Ovary* hemispheric, top almost truncate; style very short, stigma large, elongate conic. *Fruit* 4 in. long, "pyriform, abounding in caoutchouc; pericarp thick, leathery. *Seeds* many, naked, cotyledons pink fleshy" (*Maingay*).

** *Mouth of the corolla with tubercles or scales.* (Tendrils not seen.)

7. **W. oblonga,** *Dyer in Herb. Kew.*; branches very stout, leaves elliptic obtuse or suddenly obtusely contracted at the tip opaque above, base acute, nerves 10–15 pairs arched interspaces reticulated, cymes sessile dense-fld., corolla-lobes linear-oblong longer than the rather long tube, berry oblong.

MALACCA; *Maingay* (Kew Distrib. 1089).

A long flexuose shrub (*Maingay*). *Branches* woody, obtusely angled, rough, with close-set small lenticels, bark pale. *Leaves* 3–6 by 1½–3 in., base usually rounded, thickly coriaceous; when dry dark brown and opaque on both surfaces; petiole stout, ¼ in. *Cymes* very small, sessile, pedicels very short. *Calyx-lobes* short, oblong, strongly ciliate. *Corolla-tube* ½ in., rather slender, inflated in the middle, lobes twice as long, with glands or tubercles at the sinus. *Berry* many-seeded, pericarp leathery. *Seeds* 2-seriate, imbedded in firm pulp; cotyledons large, fleshy (*Maingay*).—Abounds in tenacious milky juice.

8. **W. flavescens,** *Dyer in Herb. Kew.*; quite glabrous, leaves elliptic obtusely acuminate base subacute or rounded, nerves numerous nearly horizontal very slender interspaces reticulated, cymes sessile many-fld., corolla-tube very short, tubercles at the mouth small lobulate. Chilocarpus flavescens, *Kew Gard. Report*, 1880, 47.

SINGAPORE; in jungles near the Botanic Gardens, *H. Murton*. "A large climber; stem 8 in. diam." (*Murton*).

Branches stout, smooth, divaricate, somewhat compressed, nodes swollen, bark brown. *Leaves* 3–4 by 1½–2¼ in., thickly coriaceous, dirty brown and opaque above when dry, brighter and paler yellowish-brown beneath, nerves very distinct though slender;

petiole ¼–½ in., stout. *Cymes* numerous, 1 in. diam., branches divaricate; bracts very minute; flowers pedicelled, 4–5-merous. *Calyx* small, lobes broadly ovate. *Corolla-tube* inflated, quite glabrous within; lobes slightly falcate, forming an oblong bud narrower than the tube, which they nearly equal in length. *Anthers* shortly ovate, twice as long as the filaments. *Ovary* distinctly 1-celled with parietal many-ovuled placentas. *Fruit* unknown.

DOUBTFUL SPECIES.

9. W. RUFESCENS, *Dyer in Herb. Kew.*; leaves elliptic or elliptic-oblong or -lanceolate, obtuse, very coriaceous, shining above, red-brown when dry beneath, nerves 16–20 pairs very slender, slightly arched, interspaces reticulated.

MALACCA, *Maingay* (Kew Distrib. 1092).

Branches divaricate, thickened at the nodes, bark black; tendrils not seen. *Leaves* 2½–3 by 1–1¼ in., dirty brown above, bright-brown beneath; petiole ¼ in. *Fruit* (unripe) globose, nearly 2 in. diam.

2. CHILOCARPUS, *Blume.*

Milky sarmentose shrubs. *Leaves* opposite, nerves horizontal close. *Flowers* small, in axillary cymes. *Calyx* short, 5-lobed, eglandular. *Corolla-tube* cylindric, throat naked; lobes 5, broad, overlapping to the left, twisted to the right. *Stamens* at or below the middle of the tube; anthers lanceolate, acute, cells rounded at the base. *Disc* 0. *Ovary* 1-celled, placentas 2 parietal; style short, stigma ovoid or conical, tip obscurely 2-toothed; ovules many, 2-seriate on each placenta. *Berry* fleshy, at length 2-valved. *Seeds* imbedded in pulp, or in a granular substance, compressed or thick, grooved or excavated at the hilum, albumen copious, horny, equable or ruminate; cotyledons flat, radicle elongate. —DISTRIB. Species 8, Malayan and Australian.

* *Pedicels bracteate at the base only; flowers very small, in lax panicled cymes; tube of corolla inflated in the middle* (fruit unknown).

1. **C. atro-viridis,** *Blume Mus. Bot.* i. 153; glabrous, leaves oblong obtusely caudate, nerves very numerous nearly horizontal straight slender. *Miquel Fl. Ind. Bat.* ii. 393. C. malabaricus, *Beddome Ic. Pl. Ind. Or.* t. 175. Hunteria? atro-viridis, *Wall. Cat.* 1614; *A. DC. Prodr.* viii. 351. Winchia atro-viridis, *Kurz For. Fl.* ii. 170.

MALAYAN PENINSULA; Tavoy, *Gomez*; Mergui, *Griffith, Parish.* MALABAR; *Beddome.*

Branches slender; bark smooth, sparsely lenticellate. *Leaves* 3½–6 by 1½–2 in., thinly coriaceous, base acute, green and opaque when dry above, paler green beneath, minutely dotted and with a recurrent nerve from the marginal one between every pair of primaries; petiole ¼–½ in., slender. *Cymes* 2–4 in., on slender pedicels; branches trichotomous, spreading, slender; flowers pedicelled, 3-nate or subumbellate; bracts minute. *Calyx-lobes* rounded, with white margins. *Corolla* ⅛ in. long, tube inflated in the middle, glabrous externally, pubescent at the mouth and base of the stamens within; lobes short, falcate, broadly notched on one side, inflexed and forming a globose bud. *Anthers* subsessile, oblong. *Ovary* acute. *Fruit* unknown.—The *C. denudatus*, Blume, of Java, may prove to be the same as this.

** *Pedicels with many imbricate bracts; flowers very small; fruits capsular.*

2. **C. enervis,** *Hook. f.*; leaves oblong or elliptic-lanceolate obtuse or obtusely apiculate narrowed into a slender petiole nerveless, fruit 4 in. ellipsoid narrowed to an obtuse point base contracted into a short stipes, pericarp very thick.

MALACCA; *Maingay* (Kew Distrib. 1044).

Scandent; branches stout, smooth, swollen at the nodes. *Leaves* 3 by 1–1½ in.,

very thickly coriaceous, brown and opaque above when dry, brighter brown beneath, midrib stout; petiole $\frac{1}{3}$ in. *Flowers* unknown. *Fruit* on a very stout woody pedicel with remains of minute persistent bracts in spiral series, bright orange coloured; pericarp very thick, dehiscent, pulp coarsely granular. *Seeds* very numerous, irregularly broadly oblong, ends rounded, hilum excavated, testa smooth, albumen solid horny.

3. **C. decipiens,** *Hook. f.*; glabrous, leaves elliptic-oblong or -ovate obtusely acuminate, base acute, nerves very numerous slender nearly horizontal, fruit linear-oblong cylindric rounded at both ends, pericarp woody.

MALACCA; *Maingay* (Kew Distrib. 1060 and 1043, *C. atro-viridis*).

Leaves 3–3$\frac{1}{2}$ by 1–1$\frac{1}{2}$, hardly shining above and greenish when dry, beneath pale brown minutely dotted; nerves very slender but prominent on both surfaces; petiole $\frac{1}{4}$ in. *Cymes* rather slender, dichotomously branched; flowers not seen. *Fruit* 1$\frac{1}{2}$–2$\frac{1}{2}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., on a stout pedicel bearing numerous minute bracts in spirals. *Seeds* large, "albumen horny, dull white; cotyledons blood-red, fleshy, convolute" (*Maingay*).—The foliage resembles *C. atro-viridis*, but there are no recurrent nerves between the primaries.

*** *Pedicels bracteate at the base only; flowers long; tube of corolla inflated towards the base.*

4. **C. Maingayi,** *Dyer in Herb. Kew.*; glabrous, leaves elliptic-oblong obtuse base acute, nerves numerous slightly arched strong beneath, cymes long very stout, pedicels subverticillately branched.

MALACCA; *Maingay* (Kew Distrib. 1046).

A climber; branches stout, smooth, shining, swollen at the nodes. *Leaves* 3–4 by 1–2 in., coriaceous, opaque, dull yellowish green when dry on both surfaces; nerves 20–30 pairs, with a recurrent one from the intramarginal between each pair; petiole $\frac{1}{2}$ in., very stout. *Cymes* elongate, erect; peduncles very stout, 1–3 in., bearing superposed pairs of very short branches, the crowded flowers of which give them a somewhat whorled appearance; flowers $\frac{3}{4}$ in. long, sessile or stoutly pedicelled. *Calyx-lobes* rounded, short. *Corolla-tube* very slender, with a ring of hairs below the anthers within; lobes inflexed and forming an ovoid bud much broader than the tube, when expanded $\frac{1}{2}$ in. long, ovate-lanceolate, narrowed into long points. *Anthers* small, ovate, longer than the slender filament. *Ovary* acute, "1-celled with 4 parietal placentas," *Maingay*. *Fruit* "spherical and obtusely conoid, coriaceous, fleshy, capsular, orange-yellow. *Seeds* very many, immersed in angular bright yellow masses (pulp), mixed with delicate arachnoid fibres, subquadrate, curved on one surface, deeply channelled on the other; testa cartilaginous, bright brown; albumen horny; embryo axile; cotyledons semi-oval, flat, white" (*Maingay*).

3. LEUCONOTIS, *Jack.*

Erect milky evergreen shrubs. *Leaves* opposite, nerves distant. *Flowers* in peduncled axillary cymes, 4-merous. *Calyx* 4-lobed or -partite, eglandular or minutely glandular within. *Corolla* salver-shaped, tube dilated in the middle, throat naked; lobes 4, short, overlapping to the left. *Stamens* 4, in the middle of the tube, included, anthers linear, cells rounded at the base. *Disc* 0. *Ovary* 2-celled; style short, top thickened, stigma 2-toothed; ovules 2, laterally affixed in each cell. *Berry* ovoid or globose. *Seeds* 1–3, imbedded in pulp, ovoid-oblong, testa membranous, albumen 0; cotyledons thick, fleshy, inner faces irregular, radicle short superior.—DISTRIB. Species 6, Malayan (not Javan).

* *Calyx 4-partite, segments long linear.*

1. **L. eugenifolius,** *A. DC. Prodr.* iii. 371; shoots petioles and nerves

beneath rusty-puberulous, leaves opaque above oblong obtusely caudate base obtuse, nerves 8–10 pairs united by a strong intramarginal one, cymes few-fld. *Miquel Fl. Ind. Bat.* ii. 398. L. cuspidatus, *Blume Mus. Bot.* i. 112; *Miquel l. c.* 398. Melodinus? eugenifolius, *Wall. Cat.* 1616.

PENANG; *Wallich.*—DISTRIB. Sumatra, Borneo.

Branches strict, obscurely angled, bark smooth. *Leaves* 3–4 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., tip $\frac{1}{2}$ in. long, very narrow, pale or dark greenish-brown when dry above, beneath much paler yellow-brown and minutely dotted and with strong horizontal nerves; petiole slender, $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* erect; peduncle 1 in.; bracts linear; pedicels short; flowers erect, nearly $\frac{1}{2}$ in. long. *Sepals* very narrow, erect, deciduous in fruit. *Corolla* coriaceous, tube as long or half as long again as the calyx, pubescent within; lobes short, puberulous on both surfaces. *Anthers* sessile, elongate-lanceolate. *Ovary* deeply grooved, narrowed into the grooved style, stigma oblong, 2-fid. *Fruit* "the size of a gooseberry," *Don.*

** *Calyx 4-lobed, lobes short rounded.*

2. **L. Griffithii,** *Hook. f.*; glabrous, leaves elliptic obtusely acuminate shining above base rounded or subacute, nerves 5–7 pairs very faint, cymes shortly stoutly peduncled glabrous, flowers densely crowded sessile or shortly pedicelled.

MALACCA; *Griffith, Maingay* (Kew Distrib. 1051, *L. anceps*?). ?SINGAPORE; *T. Anderson.*

Branches obscurely angled, lenticellate. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., thickly coriaceous pale brown when dry, beneath paler still and very opaque chocolate-brown, and minutely dotted or not, intramarginal nerve very faint; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* erect, peduncle shorter and stouter than the petiole; branches very short, thick and crowded; bracts small, broad; flowers $\frac{1}{2}$ in. long. *Calyx* small, lobes rounded. *Corolla* thickly coriaceous, tube cylindric, glabrous within and without; lobes short, rounded forming an ovoid bud broader than the tube. *Anthers* sessile, narrowly lanceolate, acuminate. *Fruit* $1\frac{1}{2}$ in. long, broadly ellipsoid. *Seeds* $\frac{1}{2}$ in. long, oblong, compressed, smooth.—Very near *L. anceps*, Jack., but which has long-peduncled puberulous cymes with long-pedicelled flowers. Anderson's Singapore specimens have the leaves opaque above, and broader, but the flowers appear to be identical.

3. **L. Maingayi,** *Dyer in Herb. Kew.*; quite glabrous, leaves oblong abruptly obtusely acuminate shining above, nerves 6–10 pairs slender arched, base acute or rounded, cymes very shortly and very stoutly peduncled glabrous few-flowered, flowers sessile or stoutly pedicelled.

SINGAPORE; *Maingay* (Kew Distrib. 935).

Characters very much those of *L. Griffithii*, but a much stouter plant; leaves coriaceous but very dark brown, with stronger nerves beneath and longer petioles, 1–$1\frac{1}{4}$ in. long; peduncle of cymes $\frac{1}{4}$–$\frac{1}{2}$ in., and $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; calyx much larger, as broad as the peduncle of the cyme; bracts triangular, thickly coriaceous.

4. MELODINUS, *Forst.*

Evergreen, erect or climbing shrubs. *Leaves* opposite. *Cymes* terminal and axillary, flowers rarely 4-merous, white or pale pink. *Calyx* 5-partite, eglandular within. *Corolla* salver-shaped, mouth with thick cleft or lobed scales; lobes overlapping to the left. *Anthers* included, subsessile, lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 2-celled, acute; style short, stigma thick 2-fid; ovules many in each cell. *Berry* globose, pericarp coriaceous or hard. *Seeds* many, imbedded in pulp, albumen fleshy; cotyledons thin, radicle short.—DISTRIB. About 15 species, East Asiatic, Malayan, Australian and Pacific.

* *Flowers in terminal panicled cymes. Corolla-lobes oblong or rounded, quite entire.*

1. **M. monogynus,** *Roxb. Fl. Ind.* ii. 56; leaves oblong or oblong-lanceolate acute or obtuse base acute or rounded, corolla-tube $\frac{1}{2}$–$\frac{3}{4}$ in., lobes as long oblong. *A. DC. Prodr.* viii. 329; *Wall. Cat.* 1603; *Wight Ic.* t. 394; *Bot. Reg.* t. 834; *Bot. Mag.* t. 2527. Echaltium piscidium, *Wight Ic.* t. 242, *excl. fig. of fruit.* Nerium piscidium, *Roxb. Fl. Ind.* ii. 7, *excl. descr. of fruit.*

SIKKIM HIMALAYA; at Bartning, alt. 4500 ft. (leaves only), *Clarke.* ASSAM, SILHET and the KHASIA MTS., common, ascending to 4000 ft. PENANG; *Maingay.*

A tall milky climber, branches smooth. *Leaves* 5–6 by $1\frac{1}{2}$–2 in., pale brown when dry and shining above, nerves many but not close, very slender, arching: petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Panicles* puberulous, sometimes 12 in. long, brachiate, drooping; flowers usually 3-nate, nearly white, fragrant; pedicels long or short; bracts caducous. *Calyx-segments* $\frac{1}{6}$ in., broad, ciliolate. *Corolla-tube* villous or bearded within, lobes obtuse. *Fruit* globose, obscurely 4-angled, size and colour of an orange; pericarp coriaceous. *Seeds* numerous. Roxburgh erred in describing the scales of the corolla as being undivided.

2. **M. khasianus,** *Hook. f.*; leaves linear-lanceolate acuminate at both ends membranous, cymes short few-fld., corolla-tube $\frac{1}{6}$ in., lobes rounded.

KHASIA MTS.; Moflong wood, &c., alt. 5–7000 ft., *Griffith. J. D. H. & T. T.*

A smaller plant in all its parts than *M. monogynus,* with leaves $2\frac{1}{2}$–5 by 1–$1\frac{1}{4}$ in., and more membranous, very much smaller flowers with a short corolla-tube and rounded lobes, and with the fruit only $1\frac{1}{2}$ in. diam.

** *Flowers small in axillary cymes or fascicles. Corolla-lobes very obliquely 2-lobed or 2-fid at the tip.*

3. **M. orientalis,** *Blume Bijd.* 1026, and *Mus. Bot.* i. 155, fig. 41; quite glabrous, leaves oblong or elliptic-oblong obtusely acuminate base acute, nerves very numerous nearly horizontal very slender, cymes shortly peduncled few-fld., corolla $\frac{1}{3}$ in. lobes short obliquely ovate bicuspidate, scales closing the mouth very thick fleshy lobulate. *Miquel Fl. Ind. Bat.* ii. 395, t. 34; *A. DC. Prodr.* viii. 330; *Kurz in Journ. As. Soc.* 1877, ii. 250, *in note.* Hunteria? cuspidata, *Wall. Cat.* 1609; *A. DC. l.c.* 350. Alyxia? cuspidata, *Wall. Herb.* Chilocarpus cuspidatus, *Benth. in Gen. Pl.* ii. 698 (under *Hunteria*).

PENANG; *Wallich, Phillips, Maingay* (Kew Distrib. 1043/2, *Chilocarpus suaveolens*).—DISTRIB. Java, Sumatra.

Branches smooth, rather slender, bark very dark. *Leaves* 4–5 by $1\frac{1}{2}$–2 in., thinly coriaceous, greenish brown and shining above when dry, pale yellower green beneath, margins a little undulate; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* with very short stout peduncles; flowers crowded; bracts rounded, persistent. *Calyx* small, lobes rounded. *Corolla* very thickly coriaceous, tube swollen in the middle, lobes forming a globose bud; lobes shorter than the tube. *Fruit* "large, yellow" (*Maingay*).

4. **M.? micranthus,** *Hook. f.*; quite glabrous, leaves elliptic-lanceolate obtusely acuminate base acute nerves remote very slender, cymes subsessile many-flowered, corolla $\frac{1}{8}$–$\frac{1}{6}$ in. long, lobes short unequally obtusely 2-lobed, scales closing the mouth 2-lobed.

MALACCA; *Maingay* (Kew Distrib. 1090).

Branches smooth, rather slender; bark black. *Leaves* 3–6 by 1–$1\frac{3}{4}$ in., coriaceous, dark brown and shining when dry above, paler bright brown beneath, margins somewhat undulate; petiole $\frac{1}{6}$ in. *Fascicles* of flowers $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; bracts broad, short, deciduous. *Calyx* very small, lobes rounded. *Corolla* coriaceous, tube much swollen in the middle; lobes short, forming a globose bud, obliquely 2-fid, sinus broad,

longer lobule ciliate or toothed at the tip. *Anthers* narrowly lanceolate, acuminate. *Fruit* unknown.—Maingay observes that this resembles a *Melodinus*.

5. WINCHIA, *A. DC.*

A slender twining evergreen shrub. *Leaves* 3 in a whorl. *Flowers* small, in terminal paniculate cymes. *Calyx* small, 5-lobed, eglandular within. *Corolla* salver-shaped, tube nearly cylindric; lobes rounded, velvety, overlapping to the left; throat villous. *Anthers* above the middle of the tube, included, subsessile, cells rounded at the base, dehiscing almost throughout their length. *Disc* 0. *Ovary* short, 2-celled, top rounded glabrous; style short, stigma with a calyptriform base; ovules in several series, placentas on the septum. *Fruit* not seen.

W. calophylla, *A. DC. Prodr.* viii. 326; *Kurz For. Fl.* ii. 170; *Deless. Ic. Sel.* v. t. 46. Alyxia? calophylla, *Wall. Cat.* 1607. A. glaucescens, *G. Don Gen. Syst.* iv. 97 (descript. incorrect).

MARTABAN; *Wallich.*

Leaves 2–4 in., oblong-lanceolate, obtusely caudate, acuminate, base acute very shining above and dark olive brown when dry, pale beneath, margins waved, coriaceous; nerves very numerous, close and horizontal; petiole slender, $\frac{1}{2}$–$\frac{3}{4}$ in. *Cymes* glabrous, rounded, shortly peduncled, 1–2 in. diam.; bracts minute; pedicels short. *Calyx* campanulate, lobes rounded, ciliolate. *Corolla-tube* $\frac{1}{6}$–$\frac{1}{4}$ in., four times longer than the calyx, inflated below the top; lobes short, white with velvety hairs.

6. CARISSA, *Linn.*

Spinous, densely branched, usually erect shrubs. *Leaves* opposite, small, coriaceous. *Flowers* in terminal and axillary peduncled 3-chotomous cymes. *Calyx* 5-partite, glandular within or not, segments acute. *Corolla-tube* cylindric, throat naked, lobes overlapping to the right (in the Indian species). *Stamens* at the top of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* 0. *Ovary* 2-celled; style filiform, stigma fusiform or columnar, minutely 2-fid; ovules 1–4 in each cell, rarely more. *Berry* ellipsoid or globose, 2- (or by abortion 1-) celled. *Seeds* usually 2, peltately attached to the septum, albumen fleshy; cotyledons ovate.—DISTRIB. Species about 20, African, Asiatic and Australian.

The Indian species of this genus are very difficult of definition, and are probably reducible to one or two very variable plants. The tickets of Wallich's specimens in Herb. Linn. Soc. have been, I fear, much misplaced.

* *Spines straight.*

1. **C. Carandas,** *Linn.*; *A. DC. Prodr.* viii. 332; shrubby or arborescent, quite glabrous except the puberulous cymes, leaves $1\frac{1}{2}$–3 in. oblong rounded broadly ovate or obovate shining above, tip rounded or obtuse, nerves numerous, corolla $\frac{3}{4}$–1 in. long, ovary 4- or 8-ovuled, berry $\frac{1}{2}$–1 in. ellipsoid 4- or more-seeded. *Wall. Cat.* 1677, *partly*; *Roxb. Cor. Pl.* i. 55, t. 77, and *Fl. Ind.* i. 687, and *ed. Wall. & Carey* ii. 523; *Wight Ic.* t. 426, and *in Hook. Comp. Bot. Mag.* i. 276, t. 12; *Lamk. Ill.* t. 118, fig. 1; *Lodd. Bot. Cab.* t. 663; *Brand. For. Fl.* 320; *Gibs. Cat. Bomb. Pl.* 116; *Dalz. & Gibs. Bomb. Fl.* 143; *Kurz For. Fl.* ii. 169; *Beddome Fl. Sylv.* 156, t. 19, fig. 6. C. congesta, *Wight Ic.* t. 1289.

Throughout the drier sandy or rocky soils of INDIA, native or cultivated; from the Punjab to Ceylon, Birma and Malacca.—DISTRIB. Java, Timor.

A large shrub or small gnarled tree with many dichotomous, rigid, spreading

branches; axils and nodes with 2 simple or forked thorns, sometimes 1–2 in. long. *Leaves* subsessile, 1½–3 by 1–1½ in., rather thinly coriaceous, base rounded or retuse, tip rarely mucronate. *Cymes* terminal, peduncle stout, ¼–1 in.; bracts minute; flowers crowded, white or pale rose-coloured, odorous. *Calyx-segments* subulate-lanceolate, acute, puberulous and ciliate. *Corolla-tube* ¾ in., glabrous or puberulous with swollen throat and lobes pubescent, lobes lanceolate, acute, about half as long as the tube. *Ovary-cells* 4-ovuled, *Drupe* ½–1 in. long, ellipsoid, red then black, polished, 4- or more-seeded.

VAR. *congesta*, Beddome Fl. Sylv. Anal. Gen. 156; ovarian cells 2-ovuled. *Kurz in Journ. As. Soc.* 1877, ii. 250. C. congesta, *Wight Ic.* t. 1289.—Mt. Aboo, *Stocks*; Kurg, the Wynaad and Birma.

2. **C. spinarum,** *A. DC. Prodr.* viii. 332; suberect, shrubby, glabrous or branches cymes and leaves beneath finely puberulous, leaves ½–1½ in. elliptic ovate or rounded acute mucronate or apiculate rarely obtuse many or few-nerved shining above, corolla ½ in. long, ovary 4-ovuled, berry ¼ in. subglobose. C. diffusa, *Roxb. Fl. Ind.* i. 689, and *ed. Wall. & Carey*, ii. 524; *A. DC. l. c.*; *Wight Ic.* t. 427; *Wall. Cat.* 1678, *partly*; *Brand. For. Fl.* 321; *Kurz For. Fl.* ii. 169; *Beddome Fl. Sylv.* t. 157.

Drier parts of INDIA; from the Punjab Himalaya, which it ascends to 6000 ft. in Murree, to Ceylon and Birma.

Probably a state of *C. Carandas* as suggested by Brandis, than which it is a smaller plant with shorter and more slender spines, more acute leaves and a smaller berry.

VAR. *hirsuta*; more pubescent. C. hirsuta, *Roth Nov. Sp.* 128; *A. DC. Prodr.* viii. 333; *Kurz For. Fl.* ii. 169; *Dalz. & Gibs. Bomb. Fl.* 143. C. villosa, *Roxb. Fl. Ind. ed. Carey & Wall.* ii. 525; *Grah. Cat. Bomb. Pl.* 116. *Wight Ic.* t. 437. Not uncommon.

3. **C. paucinervia,** *A. DC. Prodr.* viii. 333; suberect, shrubby, glabrous except the puberulous petioles and cymes, leaves 1–1½ in., elliptic-oblong or -lanceolate acute at both ends very coriaceous not shining, nerves 2–3 pairs very oblique, corolla ⅙–⅓ in., berry ⅓ in. ellipsoid. *Wight Ic.* t. 1290. C. diffusa, *Wall. Cat.* 1678, *in part.* C. Carandas, *var.* paucinervia, *Beddome Fl. Sylv. Anal. Gen.* 156; *Kurz in Journ. As. Soc.* 1877, ii. 250.

LOWER BENGAL; Monghir, *Hamilton in Herb. Wall.* NILGHERRY MTS.; at the Kaitia Falls, *Wight*, &c. ? C. salicina, *Lamk.*; *A. DC. l. c.*

A small ramous shrub, with the habit of *C. diffusa*, and probably, as Beddome conjectures, a variety of that species, but very distinct in appearance, more densely leafy, the leaves less shining than in its congeners and yellower when dry. *Peduncles* very short, 3–5-fld. *Corolla-lobes* very narrow.—I suspect a mistake as to the Monghir locality and that Wallich's specimens are mislabelled.

** *Spines decurved.*

4. **C. macrophylla,** *Wall. Cat.* 1679; shrubby, erect; quite glabrous except the puberulous cymes, leaves 2–4 in. ovate or elliptic-ovate acute or acuminate many-nerved, cymes sessile, corolla 1 in., berry ¾–1 in. ellipsoid. *A. DC. Prodr.* viii. 332. C. inermis, *Vahl Symb.* iii. 43; *A. DC. l. c.* 335. C. lanceolata, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 143. C. Dalzellii, *Beddome For. Fl. Anal. Gen.* 157. C. mitis, *Heyne mss.*

DECCAN PENINSULA; Kurg, *Heyne*; the Concan, at Ramghat, *Dalzell*; Courtallum, *Roth*, *Wight.*

A large shrub, thorns very strong, curved, 1–1½ in., and branches dark brown. *Leaves* shortly petioled, drying dark brown. *Flowers* as in *C. Carandas*, but lobes of corolla longer and narrower. *Calyx-lobes* longer and more slender, almost filiform in the Courtallum specimens, which have smaller leaves.—I cannot doubt this being

Vahl's *C. inermis*, described by him from a spineless branch, which justifies the abandonment of his name *inermis*.

5. **C. suavissima,** *Beddome mss.*; climbing, quite glabrous, leaves 2–3 in. broadly ovate acute or acuminate many-nerved, cymes sessile, corolla 1 in. long, berry 2 in. long.

DECCAN PENINSULA; mountains of the Madura district, *Beddome*.

This closely resembles *C. macrophylla*; but differs in the slender climbing habit, very small spines, broader paler leaves, the perfectly glabrous flowers and large berries. Col. Beddome describes it as a lofty climber with milky and most delicious fruit.

TRIBE II. PLUMERIEÆ.

7. RAUWOLFIA, *Linn.*

Glabrous (the Indian) shrubs. *Leaves* 3–4-nately whorled, rarely opposite; nerves slender, remotely arched, axils glandular. *Peduncles* alternating with the terminal leaves, becoming lateral. *Calyx* 5-fid or -partite, eglandular within. *Corolla* salver-shaped, tube cylindric, mouth constricted, throat usually hairy within; lobes broad, overlapping to the left. *Stamens* included at or above the middle of the tube; anthers small, acute, cells rounded at the base. *Disc* large, cup-shaped or annular. *Carpels* 2, distinct or connate; style filiform, stigma broad calyptriform at the base, tip 2-fid; ovules 2, collateral in each carpel. *Ripe carpels* drupaceous, distinct or connate, usually 1-seeded. *Seeds* ovoid, albumen fleshy; cotyledons flat.—DISTRIB. Species about 40, chiefly tropical American.

* *Corolla-tube slender, inflated a little above the middle.*

1. **R. serpentina,** *Benth. in Gen. Pl.* ii. 697; leaves elliptic-lanceolate or obovate acute or acuminate, nerves 8–12 pairs, cymes long-peduncled rounded rarely racemose fruiting erect, sepals short lanceolate, corolla-tube long slender shortly globosely inflated above the middle, drupes ¼ in. broadly obliquely ovoid. *Kurz For. Fl.* ii. 17. Ophioxylon serpentinum, *Linn.*; *A. DC. Prodr.* viii. 342; *Bot. Mag.* t. 784; *Jones in As. Research.* iv. 308; *Roxb. Fl. Ind.* i. 694, and *ed. Carey & Wall.* ii. 530; *Wight Ic.* t. 849; *Grah. Cat. Bomb. Pl.* 116; *Dalz. & Gibs. Bomb. Fl.* 144; *Bedd. For. Fl. Anal. Gen.* 156; *Miq. Fl. Ind. Bat.* ii. 404. O. trifoliatum, *Gaertn. Fruct.* ii. 129, t. 109, fig. 2; *Miquel l. c.* O. obversum, *Miquel l. c.* 405. Tabernæmontana cylindracea, *Wall. Cat.* 4451.—*Rheede Hort. Mal.* t. 47; *Burm. Fl. Zeyl.* t. 64.

TROPICAL HIMALAYA and plains near the foot of the hills from Sirkind, *Edgeworth*, and Moradabad, *Thomson*, to Sikkim. The KHASIA MTS., ascending to 4000 ft.; ASSAM, PEGU, TENASSERIM, and in the DECCAN PENINSULA, along the Ghats to TRAVANCORE and CEYLON.—DISTRIB. Java.

A small shrub, 6–18 in., rarely 2–3 ft. high, bark white, rarely lenticellate. *Leaves* 3–7 by 1½–2½ in., green when dry, very pale beneath, narrowed into a short petiole. *Cymes* 1–2 in. diam., many-flowered; peduncle 2–5 in., stout, branches and pedicels red; bracts obsolete; pedicels ¼–⅓ in.; flowers white or pinkish, nearly 1 in. long. *Calyx* small. *Corolla-tube* often curved; lobes not one-quarter the length of the tube, margins undulate; throat hairy. *Drupes* black, endocarp slightly rugose.

2. **R. peguana,** *Hook. f.*; leaves oblong or oblong-lanceolate acuminate, cymes sessile branched from the base branches divaricate, calyx-lobes ovate acute, corolla-tube slender inflated in the middle.

PEGU; *Kurz.*

Branches rather slender, not lenticellate. *Leaves* opposite and three in a whorl,

3–5 by $1\frac{1}{2}$–$1\frac{3}{4}$ in., very membranous; nerves 7–10 pairs, very faint. *Cymes* with the main branches an inch long widely divaricating from the base, some decurved; flowers pedicelled, $\frac{1}{4}$–$\frac{2}{3}$ in. long. *Calyx* very small, many times shorter than the corolla-tube. *Corolla-lobes* very small. *Fruit* not seen.—This is closely allied to *R. serpentina*, differing in the inflorescence, smaller flowers, and calyx.

** *Corolla-tube broad, inflated at the top.*

3. **R. densiflora,** *Benth. in Gen. Pl.* ii. 697; leaves obovate or oblanceolate acuminate, nerves 8–16 pairs, cymes short- or long-peduncled or corymbose erect or spreading in fruit, sepals elongate subulate-lanceolate half the length of the broadly tubular corolla-tube which is inflated at the top, drupes $\frac{1}{3}$–$\frac{1}{2}$ in. obliquely ellipsoid. Ophioxylon neilgherrense, *Wight Ic.* t. 1292; *Dalz. & Gibs. Bomb. Fl.* 144. O. ceylanicum, *Wight Ic.* t. 1291. O. macrocarpum, *Wight l. c.* iv. part 2, 1. O. densiflorum, *Thwaites Enum.* 191; *Beddome For. Fl. Anal. Gen.* 156, t. 20, fig. 2. Tabernæmontana densiflora, *Wall. in Bot. Reg.* t. 1273; *A. DC. Prodr.* viii. 373. T. parviflora, *Herb. Heyne in Wall. Cat.* 4453.

KHASIA MTS.; alt. 1–4000 ft., *J. D. H. & T. T.* DECCAN PENINSULA, on the Western Ghats; from the Concan southwards, alt. about 6000 ft. CEYLON, ascending to 6000 ft.

A larger shrub than *R. serpentina*; branches copiously lenticellate. *Leaves* often 4 in a whorl, very variable in size, 4–10 by 2–3 in., and number and stoutness of nerves. *Cymes* often numerous, dichotomously branched, branches and pedicels erect; flowers rose-red or white, $\frac{1}{3}$ in. long. *Calyx-lobes* $\frac{1}{6}$–$\frac{1}{4}$ in. *Corolla-lobes* rounded, nearly as long as the tube. *Drupes* very rugose.

VAR. ? *macrophylla*; leaves broader 8–10 by $2\frac{1}{2}$–$3\frac{1}{2}$ in. very membranous, cymes very short branched from the base, flowers not seen, fruit as in the type. Tabernæmontana subcapitata?, *Herb. Ind. Or. H. f. & T.*—Khasia Mts., alt. 2000 ft., at Nowgong.

4. **R. microcarpa,** *Hook. f.*; leaves small oblanceolate acuminate, nerves 8–10 pairs, cymes short branched from the base, drupes ovoid $\frac{1}{4}$ in. long. Tabernæmontana microcarpa, *Wall. Cat.* 1581.

BIRMA; Taongdong (road to Ween-dow), *Wallich.*

The specimens are most wretched, consisting of two fragments of branches with 3 or 4 broken leaves and a fruiting cyme from which the solitary drupe (much eaten by insects) is detached.

5. **R. decurva,** *Hook. f.*; leaves small oblanceolate acuminate, cymes shortly peduncled decurved few-flowered, calyx-lobes lanceolate half as long as the broad corolla-tube which is inflated at the top, drupes $\frac{1}{4}$ in.

DECCAN PENINSULA; Canara and the Concan, Poonah, *Stocks*; Mundeel, *Ritchie.*

A shrub, 6 ft.; branches stout, dichotomous, lenticellate, leafy at the tips only. *Leaves* 4 in a whorl, in crowded whorls, 1–$1\frac{1}{2}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., drying brownish-green. *Cymes* short, peduncle $\frac{1}{2}$–1 in., 2–6-flowered, sometimes branched from the base; flowers $\frac{1}{3}$ in. long, white to pink. *Calyx-lobes* lanceolate, half the length of the corolla-tube. *Corolla-lobes* rounded, almost as long as the tube.—This may be a state of *R. densiflora*, but if so it is a very singular one, easily distinguished by the small leaves crowded at the tips of the woody branches, the decurved peduncles, and small flowers.

6. **R. micrantha,** *Hook. f.*; leaves elliptic-lanceolate or oblanceolate acuminate, cymes with long slender erect peduncles few-fld., calyx-lobes triangular-ovate, corolla very small tube slightly swollen at the top, lobes small, drupes $\frac{1}{6}$ in. obliquely ovate acute. Ophioxylon micranthum, *Wight mss.*

MALABAR; *Wight.*

Branches rather slender, with minute lenticels. *Leaves* opposite and 3 in a whorl,

3–5 by 1–2 in., very membranous, drying yellowish green, narrowed into an often slender petiole; nerves 10–12 pairs, very slender. *Peduncle* 1½–2 in., branches few, slender, short, divaricate; bracts minute, subulate; flowers ⅙ in. *Calyx-lobes* about one-quarter the length of the corolla-tube. *Corolla* membranous, tube broad, lobes (unexpanded) very small. *Drupes* connate to the middle.

7. **R. Beddomei,** *Hook. f.*; leaves oblanceolate acuminate, cymes with very long slender horizontal peduncles, branches few divaricate, flowers racemed, calyx-lobes triangular-ovate, corolla small, tube slightly swollen at the top, lobes small, drupe ⅓ in. gibbously ovate acuminate. Tabernæmontana verticillata, *Beddome For. Fl. Anal. Gen.* xx. fig. 3.

TRAVANCORE; *Beddome.*

Branches very slender; bark ciliate, minutely lenticellate. *Leaves* 3–6 by 1½–1¾ in., very membranous; nerves 15–20 pairs, very slender, spreading, nearly straight. *Peduncle* 3–5 in.; horizontal or decurved; branches 1–2 in., divaricate, very slender, forked, the long arms bearing racemes of flowers ¼ in. long, like those of *R. micrantha*. *Drupe* solitary, much flattened.—Allied to *R. micrantha*, differing in the leaves with more numerous straighter nerves, the very long peduncles and racemose flowers and large drupes.

DOUBTFUL SPECIES.

OPHIOXYLON BELGAUMENSE, *Wight Ic.* iv. part ii. 2 (under *O. neilgherrense*): shrubby, erect, leaves elliptic-oblong obtuse or acuminate, corymbs long-peduncled compact many-fld., flowers on rather long pedicels, calyx 5-cleft, lobes dilated broad imbricating somewhat truncate, corolla-tube long slender, lobes forming a round capitulum in bud, stamens about the middle of the tube.—Belgaum, *Law.* I find no specimen of this in Wight's Herbarium; but for the calyx it seems identical with *R. serpentina.*

R. PULAPARIA, *Roxb.*; *Smith in Rees' Cyclop.* xxix.; *A. DC. Prodr.* viii. 341; leaves 3 in a whorl, 3–4 by 1–1½ in. elliptic-lanceolate subacute, nerves very numerous nearly horizontal, cymes terminal, peduncle curved stout ½ in., pedicels and bracts downy, calyx-lobes small ovate acute downy, corolla-tube many times longer than the calyx swollen at the top glabrous, lobes short rounded.—A Calcutta garden plant, probably the W. Indian *R. nitida*, L. I have made up the description from Roxburgh's coloured figure and Smith's description, having no specimen.

8. **ALYXIA,** *Br.*

Shrubs. *Leaves* 3–4-nately whorled, rarely opposite, nerves faint. *Flowers* small, in axillary or subterminal cymes. *Calyx* short, 5-partite, eglandular within. *Corolla* salver-shaped, tube cylindric, throat naked; lobes overlapping to the left. *Stamens* at or above the middle of the tube; anthers lanceolate, base of cells rounded. *Disc* 0, or obscure. *Carpels* of ovary 2, distinct; style filiform, top oblong, urceolate or capitate, tip pointed or shortly 2-fid; ovules 2–6, 2-seriate in each carpel. *Fruit* of 1–2 drupes or berries, 1-seeded or with 2–4 1-seeded joints. *Seeds* ovoid or oblong, grooved or excavated ventrally, albumen horny, ruminate; cotyledons thin, radicle superior.—DISTRIB. Species about 30, tropical Asiatic, Malayan, Australian and Polynesian.

1. **A. gracilis,** *Benth. in Gen. Pl.* ii. 697; glabrous, twining, leaves opposite and 3 in a whorl elliptic oblong or lanceolate obtusely caudate, nerves very many faint horizontal, flowers small in long peduncled very slender branched panicles. Hunteria? gracilis, *Wall. Cat.* 1613; *A. DC. Prodr.* viii. 350.

SIKKIM HIMALAYA; in the Terai, alt. 1–2000 ft., *J. D. H.* KHASIA MTS., alt. 2–4000 ft., *De Silva, H. f. & T.*

Branches slender; bark pale, often warted. *Leaves* 3–6 by 1–1½ in., shining above, green when dry, paler beneath, base acute; petiole ¼–⅓ in. *Cymes* 2–4 in., branches spreading, very slender; bracts small, ovate, acute. *Calyx-lobes* $\frac{1}{16}$ in.,

ovate, acute. *Corolla-tube* about twice as long as the calyx; lobes oblong, obtuse, as long as the tube. *Ripe carpels* $\frac{3}{4}$ in. long, stoutly stipitate, ellipsoid, obtuse, smooth.—Habit of a *Chilocarpus.*

2. **A. coriacea,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 541, and *Cat.* 9065; bark red-brown, leaves opposite very coriaceous obovate obtuse shining above nerves ascending, cymes very short and shortly peduncled, bracts and calyx-lobes obtuse. Hunteria? coriacea, *Wall. Cat.* 1610.

PENANG; *Wallich, Porter.*

Branches very stout. *Leaves* 2–4 by 1–1$\frac{1}{2}$ in., narrowed into the petiole, yellow-brown when dry, nerves raised in the upper surface, beneath opaque dull yellow with the nerves very faint; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Cymes* $\frac{1}{2}$ in., few fld., bracts very small. *Flowers* $\frac{1}{8}$ in. long. *Calyx* very coriaceous, lobes $\frac{1}{16}$ in., acute, ciliolate. *Corolla-tube* inflated in the middle, constricted at the mouth, with 5 2-lobed glands, lobes small, oblong falcate. *Fruit* not seen.

3. **A. lucida,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 540; bark red-brown, cymes and shoots pubescent, leaves opposite or 3–4 in a whorl obovate obtuse or acute very pubescent shining above and almost so beneath, nerves nearly horizontal, cymes very short and shortly peduncled, corolla $\frac{1}{3}$ in. long. A. Gynopogon, *Wall. Cat.* 1605.

SINGAPORE; *Wallich.* MALACCA (cultivated); *Maingay.*

Branches very stout, young 4-angled. *Leaves* 3–4 by 1–1$\frac{1}{2}$ in., pale, hard and thick when dry, narrowed into a very short petiole; nerves hardly raised on either surface. *Cymes* $\frac{1}{2}$ in. long, on thick peduncles, rarely longer than the petioles; bracts oblong, pubescent; flowers yellow, fragrant. *Calyx* deeply 5-cleft, segments acute. *Corolla-tube* $\frac{1}{8}$ in., pubescent within; lobes as long, oblong. *Ovary* villous. *Ripe carpels* $\frac{1}{3}$ in. long, broadly elliptic, smooth, stipitate.

4. **A. pilosa,** *Miquel Fl. Ind. Bat.* ii. 408; branches leaves beneath and cymes softly pubescent or tomentose, leaves 3–4 in a whorl elliptic-lanceolate very coriaceous shining above, nerves very many horizontal, cymes shortly peduncled, flowers villous.

MALACCA; Mt. Ophir (*Herb. Hook.*).—DISTRIB. Sumatra, Borneo.

Branches stout; bark pale. *Leaves* 3–5 by 1–1$\frac{1}{2}$ in., drying green, narrowed into short stout petioles $\frac{1}{4}$ in., midrib stout beneath; nerves very close, faint on both surfaces. *Peduncle* equalling or shortly exceeding the petiole, very stout, bracts small; flowers subsessile, crowded, $\frac{1}{3}$ in. long. *Calyx-segments* ovate-lanceolate, obtuse, erect, one-fourth shorter than the corolla. *Corolla-tube* coriaceous, narrowly campanulate above, hairy within and without, lobes very short, rounded, glabrous within. *Fruit* not seen.—I am a little doubtful about the Malacca locality of this plant, that given above is in Sir W. Hooker's handwriting on the sheet; that on a specimen, evidently of the same collecting, in Bentham's Herbarium, is marked "Penang, Hooker, 1857."

5. **A. pumila,** *Hook. f.*; dwarf, glabrous, leaves opposite or 3 in a whorl elliptic-lanceolate obtusely acuminate very coriaceous shining above, nerves very many horizontal, cymes subsessile few-fld.

MALACCA; Mt. Ophir, *Lobb, Maingay* (Kew Distrib. 1053).

A small slender shrub (apparently scandent, *Maingay*); branches slender, young 4-angled with granulate red bark. *Leaves* 1–2 by $\frac{1}{3}$–$\frac{1}{2}$ in., drying greenish, narrowed into slender petioles, $\frac{1}{4}$ in., midrib prominent beneath, nerves very close and faint on both surfaces. *Cymes* 3–6-fld.; peduncle very short; bracts minute; flowers shortly pedicelled, quite glabrous, $\frac{1}{4}$ in. long. *Calyx-segments* small, ovate-lanceolate, thick, subacute. *Corolla-tube* inflated below the constricted mouth, throat villous within; lobes small, rounded. *Fruit* $\frac{1}{3}$ in. long, between globose and ellipsoid, apiculate, pedicel slender.

6. **A. odorata,** *Wall. Cat.* 1606; bark red, leaves opposite and 3 in a whorl, elliptic or obovate obtuse or obtusely acuminate shining above with numerous raised nearly horizontal nerves, ripe carpels fleshy. *A. DC. Prodr.* viii. 347; *Miquel Fl. Ind. Bat.* ii. 408.

TENASSERIM; between Chappedong and Amherst, *Wallich.*

Leaves 3–5 by 1½–2 in., narrowed into the very short petiole, yellow when dry; nerves almost imperceptible beneath. *Flowers* not seen. *Ripe carpels* ⅝ in. long, stipitate, ellipsoid.—This differs from *A. stellata* in the coriaceous foliage and larger carpels. A piece of the old wood in Wallich's Herbarium is covered with smooth scaling very dark-brown bark. Kurz (*in Journ. As. Soc.* 1877, ii. 251) refers this to *A. stellata*, but the fruit is very much larger than that of his own description of the latter species.

7. **A. stellata,** *Roem. & Sch. Syst.* iv. 439; quite glabrous, bark very white quite glabrous, leaves 3–4 in a whorl elliptic-lanceolate or oblong or obovate obtuse or obtusely acuminate shining above, nerves numerous very slender nearly horizontal, cymes shortly peduncled nodding panicled, corolla-tube ⅓ in. long. *Roxb. Fl. Ind.* i. 699, and *ed. Wall. & Carey*, ii. 539. *A. DC. Prodr.* viii. 346; *Wall. Cat.* 1604. Gynopogon stellatum, *Labill. Sert. Austr.-Caled.* 30, t. 34; *Kurz For. Fl.* ii. 176.

TENASSERIM and the ANDAMAN ISLDS.; *Kurz.* PENANG; *Wallich.*—DISTRIB. Malay Archipelago, Pacific Islds.

A shrub; branches slender, smooth. *Leaves* 2–5 by 1–1½ in., thinly coriaceous, green when dry, pale beneath, narrowed into a petiole ¼ in. long. *Cymes* short but effuse; bracts short, ovate; flowers very shortly pedicelled, pure white. *Calyx* deeply 5-lobed, lobes acute. *Corolla-tube* cylindric, slender, lobes short, rounded. *Ripe carpels* ellipsoid, stipitate, "size of a cherry," *Roxb.*, or "of a small pea," *Kurz*, yellowish, sometimes with a second superposed.—I am not convinced of the identity of this with the original species of New Caledonia, which has more obovate leaves.

8. **A. fascicularis,** *Benth. in Gen. Pl.* ii. 698 (under *Hunteria*); bark pale warted, leaves opposite or 3 in a whorl elliptic-oblong or -lanceolate obtusely caudate shining above with numerous parallel very slender raised nerves, cymes very shortly peduncled decurved dense-fld. glabrous or puberulous, corolla-tube ⅛ in. long. Hunteria? fascicularis, *Wall. Cat.* 1612; *A. DC. Prodr.* viii. 350.

KHASIA MTS.; *De Silva*; Churra, alt. 4000 ft., *H. f. & T.*

A woody climber, branches slender or stout. *Leaves* 3–3½ by 1–1½ in., coriaceous, green or pale brown when dry; nerves very faint beneath; petiole distinct, ¼ in. *Cymes* ¾–1 in. long, dense-fld.; flowers racemose, very shortly peduncled; bracts acute. *Calyx-lobes* ovate, acute. *Corolla-lobes* small, rounded. *Fruit* not seen. The short corolla at once distinguishes this from *A. stellata.*

9. **A. ceylanica,** *Wight Ic.* t. 1293; glabrous, branches slender, leaves opposite or 3 in a whorl broadly elliptic obtusely caudate membranous not shining, nerves distant arched, flowers solitary or 2–3-nate long pedicelled, carpels often moniliform. *Thwaites Enum.* 191; *Beddome For. Fl.* 158, t. 20, fig. 5.

CEYLON; Ambagamowa district, alt. 1–2000 ft., *Walker*, &c.

Shrubby, erect?; branches dichotomous, 4-angled. *Leaves* 2–3 by 1–1½ in., drying green, base narrowed into a short slender petiole, midrib slender; nerves 8–10 pairs, extremely faint and slender. *Pedicels* ½ in., straight, slender. *Calyx-lobes* lanceolate, acute, many times shorter than the corolla. *Corolla* yellowish, tube ½ in., very slender, funnel-shaped above, glabrous without, villous within; lobes lanceolate, acuminate, half the length of the tube. *Carpels* fleshy, scarlet, sometimes of one dimidiate-oblong compressed pedicelled 1-seeded segment, ½–¾ in. long, some-

times of 2–4 similar superimposed ones.—Very dissimilar from the other species, if indeed congeneric.

DOUBTFUL SPECIES.

GYNOPOGON BREVIFLORUM, *Kurz For. Fl.* ii. 177; glabrous throughout, scandent, leaves 2–3 in. opposite or in whorls of 3 oblong lanceolate to lanceolate obtusely caudate base acuminate thinly coriaceous, nerves parallel obsolete, petiole 2–3 in. (? lines), cymes axillary and terminal short sessile, trichotomous, pedicels glabrous very short, flowers small; calyx-lobes lanceolate acuminate, corolla-tube $\frac{1}{6}$ in., lobes shorter, drupes ellipsoid pointed glabrous, pedicel slender.—Upper Tenasserim and Martaban, in tropical forest, alt. 2000 ft.—The above description is condensed from Kurz's. I have seen no specimens.

9. **HUNTERIA,** *Roxb.*

Glabrous trees. *Leaves* opposite, coriaceous, shining, nerves very slender. *Flowers* small in terminal axillary or subterminal cymes. *Calyx* small, 5-lobed, eglandular. *Corolla* salver-shaped, tube cylindric, throat annulate, lobes overlapping to the left. *Stamens* above the middle of the tube; anthers oblong-lanceolate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top thickened, stigma shortly 2-fid; ovules 2–4 in each carpel. *Fruit* of 2 ovoid or oblong, oblique or recurved fleshy berries, 1-seeded or 2-celled by the intruded placenta, and 2-seeded, not pulpy within. *Seeds* ovoid or oblong, albumen fleshy; cotyledons thin, radicle straight.—DISTRIB. 3 Indian species.

H. corymbosa, *Roxb. Fl. Ind.* i. 695, and *ed. Carey & Wall.* ii. 53; leaves lanceolate or oblong-lanceolate obtuse or obtusely caudate shining above, cymes short terminal and axillary. *A. DC. Prodr.* viii. 350; *Wight Ic.* t. 428. H. zeylanica, *Gard. Thwaites Enum.* 191; *Bedd. For. Fl.* ii. t. 265. H.? lanceolata, *Wall. Cat.* 1611; *A. DC. l. c.* A. Roxburghiana, *Wight Ic.* t. 1294; *Thwaites Enum.* 192; *Bedd. l. c. Anal. Gen.* 158. Cameraria zeylanica, *Retz Obs.* iv. 24; *A. DC. l. c.* 389. Gynopogon lanceolatum, *Kurz For. Fl.* ii. 177. Tabernæmontana salicifolia, *Wall. Cat.* 1580. T. parviflora, *Herb. Heyne.*

DECCAN PENINSULA; Coromandel coast, *Roxburgh*, &c.; Tinnevelly Ghats, *Beddome*; Courtallum, *Heyne*, &c. TAVOY; *Wallich*, *Roxburgh*. PENANG; *Wallich*, *Phillips*. CEYLON; *Kœnig*, &c.

A tree; branches slender, smooth. *Leaves* very variable, 4–6 by $\frac{3}{4}$–2 in., very coriaceous, narrowed into the petiole, pale yellow-brown when dry; nerves very numerous, slender, spreading, with close intermediate reticulations; tip sometimes $\frac{1}{2}$ in. long; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Cymes* shortly peduncled, shortly corymbosely branched; bracts minute; flowers pedicelled, white. *Calyx-lobes* ovate, acute. *Corolla-tube* $\frac{1}{4}$ in., limb about $\frac{1}{3}$ in. diam.; lobes short, obliquely ovate-oblong. *Ripe carpels* size of a cherry, globose, pedicelled, pulpy, orange-coloured, 2-seeded.—Some Deccan specimens, figured by Wight as *H. Roxburghiana*, and which includes Wallich's *Tabernæmontana salicifolia*, have very narrow leaves.

10. **CERBERA,** *Linn.*

Small glabrous trees. *Leaves* alternate, long, nerves slender horizontal and parallel. *Flowers* large, white or red, in terminal cymes. *Calyx* 5-partite, eglandular, segments long. *Corolla* funnel-shaped, tube short, throat ribbed or with pubescent scales; lobes broad, overlapping to the left. *Stamens* included; anthers lanceolate, apiculate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top dilated, stigma 2-lobed; ovules 4 in each carpel, on the faces of a thick placenta. *Fruit* of 1 (rarely 2) globose ovoid or ellipsoid 1–2-seeded carpels; pericarp very thick, fibrous and woody. *Seeds*

broad, compressed, peltately attached to the placenta, albumen 0; cotyledon thin, radicle very short.—DISTRIB. 4 maritime species, Madagascar, tropical Asia, and the Pacific.

C. Odollam, *Gaertn. Fruct.* ii. 193, t. 124; leaves lanceolate or oblanceolate or linear-obovate acute or abruptly acuminate narrowed into the stout petiole. *A. DC. Prodr.* viii. 353; *Wight Ic.* t. 441; *Roxb. Fl. Ind.* i. 692, and *in ed. Carey & Wall.* ii. 527; *Grah. Cat. Bomb. Pl.* 116; *Brand. For. Fl.* 322; *Kurz For. Fl.* ii. 171; *Bedd. For. Fl. Anal. Gen.* 157. C. Manghu, *Linn. partly*; *Wall. Cat.* 1582, *in Roxb. Fl. Ind. ed. Wall. & Carey*, ii. 529; *Bot. Mag.* t. 1845. C. lactaria, *Ham.*; *A. DC. l. c.* C. laurifolia, *Lodd. Bot. Cab.* t. 989. Tanghinia Odollam, lactaria *and* laurifolia, *G. Don Gen. Syst.* iv. 98.—*Rheede Hort. Mal.* i. t. 39.

Salt swamps, or on the coasts of INDIA and CEYLON.—DISTRIB. Malay Archipelago, China, Australia, Pacific Islds.

A small tree or large shrub, branches very thick. *Leaves* 3–8 by 1–2 in., leathery, black when dry, shining above, nerves very slender; petiole stout, $\frac{1}{2}$–$1\frac{1}{2}$ in. *Cymes* large; peduncle 2–6 in., stout, branches corymbose; bracts ovate, deciduous; flowers white, shortly pedicelled. *Calyx-lobes* $\frac{1}{2}$–1 in., lanceolate, acuminate, revolute. *Corolla-tube* $\frac{1}{2}$ in., mouth red, limb 1–3 in. diam., lobes falcately triangular-obovate, acute. *Ripe carpel* ovoid, 2–4 in. long.—Omitted in Dalzell & Gibs. Bomb. Flora, but stated by Graham to be native of the South Concan.

11. OCHROSIA, *Juss.*

Trees. *Leaves* whorled, rarely opposite or scattered; nerves very numerous, slender, spreading. *Cymes* terminal, at length lateral, peduncled. *Calyx* 5-partite, eglandular, segments obtuse. *Corolla* salver-shaped, tube cylindric, throat naked, lobes overlapping to the right. *Stamens* above the middle of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* 0, or obscure. *Carpels* 2, distinct; style filiform, top oblong, stigma 2-fid; ovules 2–6, 2-seriate in each carpel on each side of a prominent placenta. *Fruit* of 2 (rarely 1) spreading drupes; endocarp hard, thick, usually dorsally compressed and ventrally grooved. *Seeds* solitary, or 2 separated by the placenta, flattened, albumen 0 (or fleshy?); cotyledons large, flat; radicle short, superior.—DISTRIB. Species 12, Mascarene Islands, Malay Archipelago, Australia and the Pacific.

O. borbonica, *Gmel.*; *A. DC. Prodr.* viii. 356; glabrous, leaves in whorls of 3–4 obovate narrowed into the petiole polished above, tip rounded. *Thwaites Enum.* 192. O. salubris, *Blume Mus. Bot.* i. 158; *Kurz For. Fl.* ii. 172. Cerbera parviflora, *Wall. Cat.* 1584. C. salutaris, *Lour.*; *Blume Bijd.* 1033.

Tidal forests of the ANDAMAN ISLDS., *Kurz*, of SINGAPORE, *Wallich*, and CEYLON.—DISTRIB. Java, Seychelle and Mascarene Islds.

An evergreen tree, 20 ft. high, branches very stout. *Leaves* 6–16 by 2–6 in., coriaceous, yellow when dry, nerves nearly straight; petiole $\frac{1}{2}$–2 in. *Cymes* stoutly peduncled, branches short, thick, corymbose; lower bracts sometimes leafy; flowers white, shortly thickly pedicelled. *Calyx-lobes* very coriaceous, ovate. *Corolla-tube* $\frac{1}{6}$ in., limb $\frac{1}{3}$ in. diam. *Ripe carpels* "ellipsoid-oblong, about 2 in. long" (*Kurz*).—I have seen no fruit, and have refrained from quoting synonyms, the specimens of the genus, being difficult to procure, are insufficient for complete identification; but I suspect that this species extends under various names from the Mauritius to Australia and the Fiji Islands.

12. **KOPSIA,** *Blume.*

Glabrous trees or shrubs. *Leaves* opposite, narrowed into very short petioles. *Flowers* in terminal cymes. *Calyx* small, 5-partite, segments with glandular tips, eglandular within. *Corolla* salver-shaped, tube very slender, throat hairy, lobes overlapping to the right. *Stamens* near the top of the tube, included; anthers acute, cells rounded at the base. *Disc* of 2 glands alternating with the carpels. *Carpels* 2, distinct; style filiform, thickened at the top, stigma short; ovules 2 on each carpel, 1 on either side of a thick placenta. *Fruit* of 2 obovoid or obliquely quadrate coriaceous or rather fleshy carpels, each 1-celled and -seeded or 2-celled by the intruded placenta and 2-seeded. *Seeds* oblong, albumen 0; cotyledons not thick.—DISTRIB. Species 4, Malayan.

1. **K. fruticosa,** *A. DC. Prodr.* viii. 352; leaves elliptic or elliptic-lanceolate obtusely caudate shining above, nerves 10–13 pairs, cymes subsessile, bracts ovate acute, corolla-tube inflated at the top. *Bot. Mag.* t. 4220. Calpicarpium Roxburghii, *G. Don Gen. Syst.* iv. 100; *Wight Ic.* t. 431; *Kurz For. Fl.* ii. 178. Cerbera fruticosa, *Ker, Bot. Reg.* t. 391; *Roxb. Fl. Ind.* i. 691, and *ed. Wall. & Carey,* ii. 526; *Wall. Cat.* 1583.

PEGU, MARTABAN and TENASSERIM; *Wallich,* &c., often planted.—DISTRIB. Java, Borneo.

A large evergreen shrub. *Leaves* 4–8 by $1\frac{1}{2}$–3 in., thinly coriaceous, green when dry, shining above, paler beneath; nerves slightly arched, reticulations distinct. *Cymes* short, nearly flat-topped; peduncle very short, stout; branches short, thick; bracts $\frac{1}{12}$ in. *Calyx-segments* $\frac{1}{12}$ in., ovate. *Corolla* pink, tube $1\frac{1}{2}$ in., limb $1\frac{1}{2}$–2 in. diam., mouth red. *Ovary* villous. *Ripe carpels* usually solitary, 1-seeded, urn-shaped, $\frac{1}{2}$–1 in. long, obliquely truncate, pubescent, veined; pericarp thin, greenish purple.

2. **K. macrophylla,** *Hook. f.*; leaves oblong obovate or elliptic-oblong obtusely caudate opaque above, nerves 18–20 pairs, cymes subsessile, bracts imbricate boat-shaped obtuse, corolla-tube inflated in the middle.

SINGAPORE; *Lobb.*

Leaves 5–9 by 2–3 in., thinly coriaceous, green above, paler beneath; nerves as in *K. fruticosa*; petiole hardly any. *Cyme* with a short stout peduncle and a few thick branches 1 in. long, clothed with small broad bracts. *Calyx-lobes* rounded. *Corolla-tube* 1 in., very slender, limb $1\frac{1}{2}$ in. diam., lobes obovate. *Fruit* not seen.—This resembles *K. fruticosa,* but differs conspicuously in the long opaque leaves, shorter petioles, imbricate bracts, and corolla-tube with the stamens in the middle.—I have seen only one specimen.

3. **K. pauciflora,** *Hook. f.*; leaves elliptic or elliptic-lanceolate obtusely caudate shining above, nerves 6–8 pairs, cymes sessile reduced to a very short simple rachis, bracts ovate obtuse, corolla-tube inflated at the top.

MALACCA; Mt. Ophir, *Maingay* (Kew Distrib. 1056).

Leaves yellow-green when dry, 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., firmly but thinly coriaceous, yellower beneath; petiole $\frac{1}{4}$ in. *Cyme-rachis* $\frac{1}{4}$–$\frac{1}{2}$ in. long, quite sessile, loosely clothed with bracts. *Calyx-lobes* broad, obtuse. *Corolla-tube* $1\frac{1}{2}$–2 in., very slender; lobes 1 in., linear-oblong, longer and narrower than in the two preceding species. *Fruit* not seen.—This is referred by Maingay (mss.) to Blume's *K. flavida* of New Guinea, which is described as having intensely green leaves and cymose flowers.

13. **RHAZYA,** *Dcne.*

Glabrous erect shrubs. *Leaves* alternate, thick, nerves obscure. *Flowers* in dense terminal cymes, corymbs or thyrsi. *Calyx* short, 5-partite, eglandular.

Corolla salver-shaped, tube cylindric, with reflexed hairs beneath the stamens within, throat constricted hairy; lobes 5, short, broad, overlapping to the left. *Stamens* above the middle of the tube, included; anthers lanceolate, cells rounded at the base. *Disc* annular or obscure. *Carpels* 2, distinct; style filiform, top broad thickened, stigma sometimes furnished with a reflexed membrane, top 2-globose; ovules many, 2-seriate in each carpel. *Follicles* 2, erect, slender. *Seeds* many, subterete or angled and compressed, truncate or winged above and below, albumen fleshy ruminate; cotyledons oblong, thick, radicle superior.—DISTRIB. 2 species, Arabian and Indian.

R. stricta, *Decaisne in Ann. Nat. Sc. ser.* 2, iv. 81, and *in Jacquem. Voy. Bot.* t. 111; leaves elliptic-lanceolate acute coriaceous, corolla-lobes ovate mucronate. *A. DC. Prodr.* viii. 386; *Brandis For. Fl.* 322; *Boiss. Fl. Orient.* iv. 47.—Apocyn. *Wall. Cat.* 7478.

SCINDE; *Stocks*; in the Trans-Indian territory, common; Salt-range, *Fleming*; Peshawur, *Stewart.*—DISTRIB. Affghanistan, Beluchistan, Arabia.

A small glabrous very stout erect sparingly branched leafy shrub. *Leaves* 3–4 by ½–¾ in., yellowish and leathery when dry, sessile. *Flowers* in short axillary, stoutly branched cymes, shortly and stoutly pedicelled; bracts subulate, persistent. *Calyx-lobes* acute. *Corolla* white, tube ⅓ in., upper half inflated. *Follicles* erect, parallel, 2–3 by ¼ in., slightly compressed, thinly coriaceous. *Seeds* ⅓ in. long, angularly compressed, shortly winged.—There is no specimen of this on the sheet in Wallich's Herbarium to which his ticket, No. 7478, is attached, but the note on that ticket is "Apocyn. (ex Royleo in cujus Herbar. adsunt specim. et icon. pict.) viminea, subaphylla, *Doab Hindostaniæ*, 1825," leaves no doubt as to the plant meant; added to which the icon alluded to, made by Royle's artists, is in the Kew collection of drawings.

14. **VINCA,** *Linn.*

Erect or procumbent herbs or shrubs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* 5-partite, eglandular, segments narrow. *Corolla* salver-shaped; tube cylindric, with usually reflexed hairs below the stamens; throat constricted, hairy or thickened; lobes broad, overlapping to the left. *Stamens* above the middle of the tube, included; anthers various. *Disc* of 2 large glands. *Carpels* 2, distinct; style filiform, top thick, stigma annulate viscid sometimes with a reflected membrane, tip minute penicillate: ovules 6 or more, 2-seriate in each carpel. *Follicles* 2, slender, erect or spreading. *Seeds* subcylindric, truncate at both ends, hilum lateral, albumen fleshy; cotyledons ovate, radicle long superior. —DISTRIB. About 10 species, European, Indian, American, and Madagascarian.

V. ROSEA, *Linn.* (V. Gulielmi Waldemarii, *Klotzsch in Reise Pr. Waldem. Bot.* t 70); a West Indian plant, is much cultivated about pagodas, &c.; it has obovate leaves and rosy flowers 1½–2 in. diam.

V. pusilla, *Murr. in Act. Goett.* 1772, 66, t. 2, fig. 1; annual, erect, glabrous, branched from the base, leaves lanceolate acuminate, flowers very small subsessile, sepals filiform. *A. DC. Prodr.* viii. 382; *Dalz. & Gibs. Bomb Fl.* 144. V. parviflora, *Retz Obs.* ii. n. 33; *Roxb. Fl. Ind.* ii. 1. Catharanthus roseus, *G. Don Gen. Syst.* iv. 95.—*Rheede Hort. Mal.* ix. t. 33.

WESTERN HIMALAYA; Garwhal, alt. 2000 ft., *Str. & Winterb.*; UPPER GANGETIC PLAIN, *Royle*, &c. Throughout the DECCAN, common.

An erect, pale-green annual, 1–2 ft. high; stem and branches acutely 4-angled. *Leaves* 1½–2½ by ⅓–¾ in., membranous, acuminate, margins minutely scabrid, stipular glands subulate; petiole ¼ in. or less, slender. *Flowers* ⅓ in. long, on short pedicels, white. *Corolla* mouth narrow, hairy; throat glabrous, thickened. *Follicles* 2–3 in., very slender, diverging, straight, membranous. *Seeds* $\frac{1}{10}$ in., linear-oblong, cylindric rounded at both ends; testa black, many-ribbed, ribs rough.

14*. PLUMERIA, *Linn.*

Erect trees; branches very thick. *Leaves* scattered, elongate, nerves numerous, horizontal. *Flowers* large, in terminal 2-3-chotomous cymes; bracts many, broad, deciduous. *Calyx* small, 5-fid, eglandular within; lobes broad, obtuse. *Corolla* salver-shaped, throat naked, lobes overlapping to the left, rarely to the right. *Stamens* near the base of the tube; anthers obtuse, cells rounded at the base. *Disc* 0, or lining the calyx-tube. *Carpels* 2, distinct; style short, stigma 2-lobed; ovules ∞-seriate in each cell. *Follicles* linear-oblong or ellipsoid. *Seeds* oblong or lanceolate, plano-convex, winged, albumen fleshy, thin; cotyledons oblong or ovate-cordate.—DISTRIB. About 40 species, all natives of tropical America.

P. acutifolia, *Poiret*; leaves oblong acute at both ends. *A. DC. Prodr.* viii. 392; *Wall. Cat.* 1636; *Wight Ic.* t. 471; *Brand. For. Fl.* 323; *Kurz For. Fl.* ii. 179; P. acuminata, *Roxb. Fl. Ind.* ii. 20; *Bot. Reg.* t. 114; *Bot. Mag.* t. 3952.

Cultivated and naturalised in many parts of INDIA.

A small tree with crooked trunk and rough bark; branches swollen and leafy at the tips. *Leaves* 8–12 in.; petiole 1–1½ in., 1-glandular at the top. *Flowers* many, fragrant, pink externally, white within. *Follicles* about 5 in. long, cylindric.

15. ELLERTONIA, *Wight.*

Glabrous climbing shrubs. *Leaves* opposite or 3–4-nately whorled, coriaceous. *Flowers* slender, in subterminal cymes. *Calyx* small, deeply 5-fid, eglandular. *Corolla* salver-shaped, tube cylindric; throat constricted, naked; lobes 5, narrow, overlapping to the left. *Stamens* in the middle of the tube, filaments ciliate; anthers lanceolate, cells obtuse at the base. *Disc* 0. *Carpels* 2, distinct; style filiform, top ovoid or oblong, stigma linear, 2-fid; ovules many in each carpel, 2–∞-seriate. *Follicles* 2, linear or narrowly linear-oblong, terete, spreading. *Seeds* 2-seriate, oblong, flattened, peltately attached, winged above and below, albumen scanty; cotyledons thin, radicle superior. Species 2, an Indian and ? a Madagascarian.

E. Rheedii, *Wight Ic.* t. 1295.—*Rheede Hort. Mal.* ix. t. 14.

MALABAR and the CONCAN; at Quilon, *Wight*; Warree country, *Stocks, Gibson.*

Branches twining, slender, terete. *Leaves* 3–5 by 1–2 in., elliptic or oblong, obtusely acuminate, of a peculiar blue-gray hue beneath when dry, coriaceous; nerves 10–12 pairs, very slender, spreading; petiole ¼ in. *Cymes* clustered, few-fld., 1–2 in. long, 2–3-chotomously branched; bracts subulate, persistent; pedicels short. *Sepals* ovate, acuminate. *Corolla-tube* ½ in., very slender, inflated in the middle; lobes lanceolate, acuminate. *Ovary* elongate; style slender, stigmas long. *Follicles* 2–4 by ⅓ in., horizontally divaricate, sessile, straight or slightly curved, acute, coriaceous, inner coat separable. *Seeds* 1½ in., disc elliptic, wings quite straight, tips rounded.

16. ALSTONIA, *Br.*

Trees or erect shrubs. *Leaves* 3-4-nately whorled, rarely opposite. *Flowers* in subterminal corymbose cymes. *Calyx* short, 5-lobed or -partite. *Corolla* salver-shaped, tube cylindric; throat naked, annulate or with reflexed hairs; lobes overlapping to the right or left. *Stamens* near the top of the tube, included; anthers subacute. *Disc* annular, lobed or truncate or 0. *Carpels* 2 distinct; style filiform, top ovoid or oblong, stigma minute or 2-toothed; ovules many, ∞-seriate in each carpel. *Follicles* 2, linear, slender. *Seeds* oblong or linear, flattened, peltately attached, often ciliate, albumen scanty; cotyledons oblong, flat, radicle superior.—DISTRIB. Species about 30, tropical Asiatic, Malayan, Australian, and Polynesian.

SECT. I. **Pala.** *Leaves* with close parallel nervation, usually obtuse. *Corolla-lobes* overlapping to the left.

1. **A. scholaris,** *Brown in Mem. Wern. Soc.* i. 75; leaves 4-7 in a whorl obovate or elliptic-oblong white beneath, base acute, tip obtuse rounded or obtusely acuminate, cymes peduncled or sessile capitate, flowers pubescent, follicles very long and slender. *A. DC. Prodr.* viii. 408; *Wight Ic.* t. 422; *Grah. Cat. Bomb. Pl.* 115; *Dalz. & Gibs. Bomb. Fl.* 145; *Brand. For. Fl.* 325; *Kurz For. Fl.* ii. 183; *Beddome For. Fl.* 325, t. 242; *Wall. Cat.* 1644. Echites scholaris, *Linn. Mant.* 55. E. Pala, *Ham. ex Spreng. Syst.* i. 633; *A. DC. l. c.* 477.—*Rheede Hort. Mal.* i. t. 45.

Drier forests of INDIA; in the tropical region of the WESTERN HIMALAYA from the JUMNA eastwards to ASSAM, and southwards to CEYLON, SINGAPORE and PENANG.—DISTRIB. Malay Archipelago, tropical Australia and Africa.

An evergreen tree 40-60 ft., "at times 80-90" (*Brandis*); trunk tall, base often buttressed; branches whorled; juice milky bitter. *Leaves* 4-8 by 1-2½ in., very coriaceous, whitish beneath; nerves 30-60 pairs, horizontal, joining an intramarginal one; petiole stout, ¼-½ in. *Cymes* umbellately branched; peduncle 1-3 in., rarely 0, very stout; branches numerous, stout; flowers subcapitate, greenish-white. *Corolla* ⅓-½ in. diam., throat villous, lobes rounded. *Disc* 0. *Ovary* hirsute. *Follicles* 1-2 ft., pendulous in clusters, only ⅛ in. diam., terete. *Seeds* ⅓ in. long, slender.

2. **A. spathulata,** *Blume Bijd.* 1037; quite glabrous, leaves 3-5 in a whorl obovate-cuneate tip rounded concolorous beneath, cymes peduncled and pedicelled flowers quite glabrous.—*A. DC. Prodr.* viii. 410; *Miquel Fl. Ind. Bat.* ii. 437. A. cuneata, *Wall. Cat.* 1645 (*habitat wrong*).

MALACCA; in marshes, *Griffith, Maingay* (Kew Distrib. 1068).—DISTRIB. Java, Borneo.

Leaves 1½-4 in., very coriaceous, brown on both surfaces when dry, shining above, opaque beneath; nerves 20-30 pairs, horizontal; petiole very short. *Cymes* small, umbellately branched; bracts short. *Calyx-lobes* orbicular. *Corolla-tube* ¼ in., lobes elliptic, throat villous. *Disc* small. *Ovary* glabrous. *Follicles* 5-7 in. long, slender.

SECT. II. **Blaberopus.** *Leaves* with close parallel nerves, membranous, acute or acuminate. *Corolla-lobes* overlapping to the left. *Disc* of 2 ligulate glands alternating with the carpels. *Follicles* 3-6 in., broadest in the middle.

3. **A. venenatus,** *Brown in Mem. Wern. Soc.* i. 75; quite glabrous, leaves 4-6 in a whorl narrowly lanceolate finely acuminate, follicles stipitate and long-beaked. *Wall. Cat.* 1647; *Lodd. Bot. Cab.* t. 186; *Wight Ic.* t. 436; *Dalz. & Gibs. Bomb. Fl. Suppl.* 52; *Beddome For. Fl. Anal. Gen.* 160. Blaberopus venenatus, *A. DC. Prodr.* viii. 411. Echites venenata, *Roxb. Ic.*

DECCAN PENINSULA, NILGHERRY HILLS; alt. 3-4500 ft., Courtallum, Dindygul on high hills.

A shrub 6-8 ft. *Leaves* 4-8 by ½-1¼ in., narrowed into a slender short petiole, midrib stout, nerves very slender and close. *Cymes* subumbellate, the flowers often racemose on the branches. *Calyx* very small, lobes triangular-ovate, acute. *Corolla-tube* 1 in., very slender, swollen at the top, limb ⅔-1 in. diam.; lobes oblong, obtuse. *Ovary* ovoid; style slender, top barrel-shaped, stigma 2-fid. *Follicles* 4-5 by ⅓ in., sword-shaped, coriaceous, smooth, narrowed into a stalk ½-1 in. long, and into a straight beak as long. *Seeds* more than ½ in. long, linear-oblong, flat, hairs short.—Fig. 6 of Wight's plate represents the pod of *A. neriifolia.*

4. **A. neriifolia,** *Don Prodr.* 131; branchlets and leaves beneath pubescent, leaves opposite or 3-4 in a whorl narrowly lanceolate finely acuminate, follicles sessile beaked. *Wall. Cat.* 1646. Blaberopus neriifolius, *A. DC. Prodr.* viii. 411. B. Sebusii, *Van Huerck & Muell. Arg. in Plant. Nov. Herb. Van Heurck,* fasc. ii. 188.

TROPICAL HIMALAYA; Nipal, *Wallich*, near the Sikkim frontier, on dry rocks, *J. D. H.* BHOTAN; *Griffith.*

Very similar to *A. venenata*, but the leaves are more coriaceous, always more or less pubescent beneath, and much fewer in a whorl, with usually long (sometimes $\frac{1}{4}$ in.) subulate interpetiolar glands; the follicles are longer (4–7 in.), more slender, straighter, and sessile; the seeds are smaller and narrower.—*B. Sebusii*, Van H. & Muell. Argan., is founded on Griffith's Bhotan specimen, in which the leaves and flowers are those of *A. neriifolia*, but the pods, which are separate, belong to *A. venenata.*

SECT. III. **Dissuraspermum.** *Leaves* with distant nerves. *Corolla-lobes* overlapping to the right. *Disc* annular. *Follicles* long, slender, cylindric.

5. **A. macrophylla,** *Wall. Cat.* 1648; leaves 6–12 in. oblanceolate or elliptic-lanceolate obtusely acuminate pubescent or glabrous beneath, nerves 16–20 pairs, cymes numerous large terminal sessile or peduncled with slender spreading many-flowered branches, corolla-tube glabrous throat villous. *A. DC. Prodr.* viii. 409. A. costata, *Wall. Cat.* 1649, *not of Br.*

PENANG; *Wallich, Maingay* (Kew Distrib. 1066/2, 1070/2).—DISTRIB. Java, Timor, Philippine Islds.

Leaves thinly coriaceous, $2\frac{1}{2}$–3 in. broad, shining above, rather paler beneath; nerves spreading, about $\frac{1}{2}$ in. apart; base narrowed into a stout petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Cymes* copious, lax, pubescent; bracts 0; flowers small. *Calyx* campanulate, lobes short obtuse. *Corolla-tube* $\frac{1}{8}$ in., mouth contracted; lobes rounded, pubescent, thick. *Disc* annular. *Ovary* ovoid, acute, glabrous. *Follicles* very numerous, slender, pendulous, 12–18 by $\frac{1}{4}$ in., terete, membranous. *Seeds* slender, $\frac{1}{4}$ in. long.

6. **A. angustifolia,** *Wall. Cat.* 1650; leaves glabrous obovate or oblanceolate obtusely acuminate or obtuse, nerves 10–15 pairs, cymes numerous branched densely pubescent many-flowered, peduncle and branches stout, calyx urceolate lobes very short, corolla-tube densely pubescent throat villous. *A. DC. Prodr.* viii. 409.

SINGAPORE; *Wallich, T. Anderson.* MALACCA and PENANG; *Griffith, Maingay* (Kew Distrib. 1066, 1067, 1070, 1070/1, 1070/2).

A tall tree (*Maingay*), leaves much smaller and more coriaceous than *A. macrophylla*, always quite glabrous, with fewer nerves and longer petioles ($\frac{3}{4}$–1 in.) and with denser more pubescent cymes and flowers. Penang specimens have very broad leaves, 6–7 by 3 in.

SPECIES OF DOUBTFUL POSITION.

7. A. KURZII, *Hook. f.*; a tree 80–100 ft., quite glabrous; leaves whorled, 4–7 in. long, oblong to obovate-oblong, tip retuse or rounded, base acute or obtuse, coriaceous, glaucous beneath; nerves parallel, numerous, slender; flowers small, white, densely cymulose; pedicels short and stout; cymelets shortly peduncled, whorled, forming a long peduncled, glabrous axillary panicle; follicles linear. A. spectabilis, *Kurz For. Fl.* ii. 183, *not of Brown.*—Forests of the Andaman Islds., *Kurz.*

This is obviously not Brown's *A. spectabilis*, which is probably closely allied to *A. macrophylla.* In Journ. As. Soc. 1877, ii. 254, Kurz says of this, "hardly specifically distinguishable from *A. scholaris.*"

8. A. GRANDIFOLIA, *Miquel Fl. Ind. Bat. Suppl.* 555; leaves 5–7 in a whorl, unequal, 12–16 by 4–5 in., narrowly obovate or oblanceolate, obtusely apiculate, glaucous beneath, midrib stout, nerves 20 pairs strong; petiole very stout, 2 in.—Singapore, *T. Anderson.*—Of this I have seen only two leaves, which precisely agree with Miquel's from Sumatra.

17. DYERA, *Hook. f.*

Glabrous trees. *Leaves* whorled, petioled. *Flowers* small, in terminal and axillary umbellately branched cymes. *Calyx* hemispheric, shortly 5-lobed, eglandular within. *Corolla* salver-shaped, tube short; lobes overlapping to

the left. *Stamens* 5, in the middle of the tube, included, filaments very short; anthers oblong, obtuse, upper half empty fleshy, base obtusely 2-lobed. *Disc* annular, obscure. *Ovary* short, broadly conic, obtuse, top pubescent, 2-celled, cells many-ovuled; style 0, stigma 2-cleft, minute, sessile, pyriform, lobes appressed. *Follicles* very large long thick, straight, cylindric, obtuse, connate at the base, reflexed, furfuraceous. *Seeds* (unripe) flattened, winged.—Species 3, Malayan.

1. **D. costulata,** *Hook. f.*; leaves rounded at the base, cymes shortly peduncled, corolla-lobes about as long as the tube. Alstonia ? costulata, *Miquel Fl. Ind. Bat. Suppl.* 556.

MALACCA; *Griffith, Maingay* (Kew Distrib. 1097).—DISTRIB. Sumatra.

A tree; branches very stout. *Leaves* 6–8 in a whorl, 2–4 by 1½–3 in., broadly elliptic or oblong, rounded at both ends, hard and coriaceous, shining above, glaucous beneath; nerves 12–16 pairs, strong, nearly straight, almost horizontal or ascending, reticulations prominent above; petiole ⅓–1 in. *Cymes* numerous, twice umbellately branched, glabrous; peduncles 2–3 in.; pedicels short; flowers very small. *Calyx-lobes* rounded, coriaceous. *Corolla-tube* $\frac{1}{10}$ in. long, glabrous, lobes linear-oblong. *Follicles* 9–12 by 1–1½ in., "covered with minute crenated ferruginous squamulæ" (*Maingay*). A most remarkable plant, evidently allied to *Alstonia*, though from the seeds being imperfectly known, its exact affinity cannot be stated. The huge follicles are borne on a woody peduncle nearly ½ in. diam., their bases are entirely connate, and though quite straight they are sharply deflexed, when ripe they gape wide, and the inner shining parchment-like coat becomes irregularly torn, forming a fringe to the coriaceous outer. An allied species from Borneo, collected by Low, Lobb, and Beccari, has longer leaves (6–9 by 1–2 in.) with the base narrowed into the petiole and numerous (20–30) pairs of nerves.—All the species are said to yield gutta Jelatong.

2. **D. laxiflora,** *Hook. f.*; leaves narrowed to the rounded or subacute base, cymes long peduncled, corolla-lobes four times as long as the tube.

SINGAPORE; *Murton, Cantley.*

Closely allied to *D. costulata*, but with much larger leaves, sometimes 8 in long, petioles 1½–2 in. *Peduncles* of cyme very slender, 3–5 in., pedicels ¼–½ in. *Corolla-lobes* linear, ⅓ in. long.

18. HOLARRHENA, *Br.*

Trees or shrubs. *Leaves* opposite, membranous. *Flowers* white, in terminal or subaxillary many-flowered corymbose cymes. *Calyx* 5-lobed or -partite, usually glandular within, lobes small. *Corolla* salver-shaped, tube slender cylindric, throat contracted naked; lobes oblong, overlapping to the left. *Stamens* near the base of the tube; anthers oblong-lanceolate, mucronate, cells rounded at the base. *Disc* 0. *Carpels* 2, distinct; style short, filiform, stigma oblong-fusiform, top entire or 2-toothed; ovules many in each carpel. *Follicles* 2, elongate, spreading and incurved, terete. *Seeds* linear or oblong, compressed, concave, tipped with a deciduous coma; funicle in the concavity, albumen scanty; cotyledons broad, complicate, radicle short, superior.—DISTRIB. Species 7 or 8, tropical Asiatic and African.

1. **H. antidysenterica,** *Wall. Cat.* 1672; glabrous pubescent or tomentose, leaves shortly petioled elliptic oblong ovate or ovate-oblong obtusely acuminate. *A. DC. Prodr.* viii. 413; *Brand. For. Fl.* 326, t. 40; *Bedd. Fl. Sylv. Anal. Gen.* xx. fig. 6; *Kurz For. Fl.* ii. 182; *Dalz. & Gibs. Bomb Fl.* 145; *Beddome For. Fl. Anal. Gen.* 160, t. 20, fig. 6. H. Codaga, *G. Don Gen. Syst.* iv. 78; *A. DC. l. c.*; *Kurz For. Fl.* ii. 183; *Wight Ic.* 1297. H. pubescens, *Wall. Cat.* 1673; *A. DC. l. c.* H. malaccensis, *Wight Ic.* t. 1298. Echites antidysenterica, *Roxb.* Wrightia antidysenterica, *Grah. Cat. Bomb. Pl.* 114, *excl. some syns.* Chonemorpha ? antidysenterica, *G. Don l. c.*; *Wight Ic.* t.

439. ? H. villosa, *Ait. ex Loud. in Steud. Nomencl.—Rheede Hort. Mal.* i. t. 47.

TROPICAL HIMALAYA; ascending to 3500 ft., from the Chenab westwards, and throughout the drier forests of INDIA to TRAVANCORE and MALACCA.

A small deciduous tree, bark pale. *Leaves* 6–12 by 1½–5 in., base obtuse rounded or acute; nerves 10–14 pairs, strong, arched; petiole 0–¼ in. *Cymes* 3–6 in. diam., corymbose, sessile, terminal; bracts small, ciliate; pedicels slender. *Flowers* inodorous, white, 1–2 in. diam., puberulous. *Sepals* acuminate. *Corolla-tube* very slender, ⅓–½ in.; lobes as long, oblong, tip round. *Follicles* 8–16 by ½ in, very slender, parallel, terete, coriaceous, obscurely torulose, usually with small long white spots. *Seeds* ½ in., narrowly linear-oblong, glabrous, coma 2 in., brown.

2. **H. mitis,** *Br. in Mem. Wern. Soc.* i. 62; glabrous, leaves lanceolate or linear-lanceolate obtuse. *A. DC. Prodr.* viii. 413; *Thwaites Enum.* 194; *Beddome For. Fl. Anal. Gen.* 161.

CEYLON; not uncommon up to 1500 ft.

A medium-sized tree (*Thwaites*). *Leaves* 3–5 by ½–1 in., shining above, paler beneath, nerves about 10 pairs; petiole ¼ in. *Cymes* axillary and terminal, many-fld. *Corolla-lobes* narrowly linear. *Follicles* upwards of a foot long.—A specimen of this is in the Wallichian Herbarium without name or number, ticketed as from Herb. Finlayson; probably erroneously, as Finlayson collected only in Siam.

19. TABERNÆMONTANA, *Linn.*

Trees or shrubs. *Leaves* opposite. *Flowers* white in axillary terminal cymes. *Calyx* 5-lobed or -partite, glandular within, rarely eglandular. *Corolla* salver-shaped, tube cylindric, usually slender, inflated in the middle or top; lobes overlapping to the left. *Stamens* at or above the middle of the tube, filaments short or 0; anthers sagittate or base obtuse, acuminate. *Disc* 0. *Carpels* 2, distinct; style short or long, top urceolate ovoid or clavate, stigma short or long 2-lobed; ovules usually many, and ∞-seriate in each carpel. *Fruit* of 2 ovoid or oblong or reniform, smooth or ribbed 1–many-seeded, dry or fleshy follicles. *Seeds* buried in pulp, ovoid-oblong, subterete or compressed, grooved down one face, smooth striate or rugose, albumen fleshy equable or ruminate; cotyledons ovate, radicle short or long.—DISTRIB. About 110 species in all tropical regions.

* *Calyx* 5-lobed to the middle, lobes obtuse, eglandular or with glands on their inner faces at the base. *Corolla-lobes* globose in bud.

† *Branches stout; leaves large coriaceous; peduncles and pedicels very stout. Calyx large. Corolla-tube cylindric, stout.*

1. **T. dichotoma,** *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 21; glabrous, leaves coriaceous oblong or obovate- or linear-oblong tip rounded, base acute, nerves horizontal, petiole stout, cymes long-peduncled few-fld. *A. DC. Prodr.* viii. 366; *Wight Ic.* t. 433; *Wall. Cat.* 1570; *Thwaites Enum.* 192; *Bot. Reg.* 1841, t. 53. Cerberea dichotoma, *Lodd. Bot. Cab.* t. 1516. C. Manghas, *Linn.*, *partly* (*Thwaites*). Tanghinia dichotoma, *G. Don Hort. Brit. ed.* 3, 461.—*Burm. Thes. Zeyl.* t. 70, fig. 1.

DECCAN PENINSULA; common in the Western Ghats, *Beddome*. CEYLON; very common in the warmer parts of the island (*Thwaites*).

A small tree; branches very stout, woody, cylindric; buds resinous. *Leaves* 4–8 by 1–2 in., pale yellow-brown when dry, midrib very stout, nerves 16–22 pairs; petiole ¼–¾ in., base semiamplexicaul. *Peduncle* 2–5 in., bracts 0. *Calyx* hemispheric, very thick, lobes semicircular. *Flowers* scarcely fragrant. *Corolla* white, tube ¾–1 in., yellow, cylindric, swollen at the very base, limb white, 2–3 in. diam., mouth contracted; lobes broadly oblong, falcate, obtuse. *Anthers* half-way down the tube.

Follicles usually solitary, 4–5 by 1–2 in., recurved, oblong, narrowed at both ends, dorsally concave, ventrally 2-ribbed, orange-yellow. *Seeds* many, $\frac{3}{4}$ in. long, buried in scarlet pulp.—Though mentioned by Roxburgh and Beddome as a Malabar plant, I have seen no specimen from continental India. It is remarkable as being the only Ceylon species of this common Indian and tropical genus. The *T. dichotoma*? of Gibson's Catalogue of Bombay Plants is probably *T. Heyneana.*

2. **T. Heyneana,** *Wall. in Bot. Reg. under* t. 1273, and *Cat.* 1573; glabrous, leaves linear-oblong or -lanceolate obtusely acuminate, base acute, nerves 12–16 pairs arched, cymes peduncled many-fld. *A. DC. Prodr.* viii. 376. T. intercedens, *Van Heurck & Mull. Arg. Plant. Nov. Herb. Van Heurck*, 166. T. recurva, *Herb. Hohenack.* 1847, *not of Roxb.*

WESTERN GHATS; from the Concan, southwards, common.

Branches very stout, with pale smooth bark, grooved when dry. *Leaves* 3–8 by 1–2½ in., coriaceous, dark brown and shining above when dry, paler beneath, midrib and nerves beneath stout; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., base dilated. *Peduncle* 1–2 in.; pedicels $\frac{3}{4}$–1 in.; bracts obsolete. *Calyx* very coriaceous; lobes hardly ovate, obtuse. *Corolla-tube* 1 in., cylindric, stout, swollen at the top, limb 1 in. diam.; lobes globose in bud, falcately oblong, obtuse, crisped. *Ovary* very short; style filiform, top obconic, stigma forked. *Follicles* very variable, $\frac{1}{2}$–1 in. long, sessile, slightly recurved, shortly sausage-shaped, not keeled or ribbed, beaked or not. *Seeds* 2 or more, $\frac{1}{3}$ in. long.

3. **T. corymbosa,** *Roxb. Fl. Ind.* ii. 25; glabrous, leaves elliptic-oblong or lanceolate or oblanceolate obtuse or obtusely acuminate, nerves 10–16 pairs very spreading, cymes peduncled many-fld. *A. DC. Prodr.* viii. 376; *Wall. Cat.* 1772, and *Bot. Reg. under* t. 1273.

PENANG; *Wallich, Phillips.* SINGAPORE, *Anderson, Murton.*—DISTRIB. Java.

Very similar to *T. Heyneana*, but with smaller and more crowded flowers on slenderer pedicels, more obtuse leaves with straighter nerves. *Branches* stout; bark pale, smooth, grooved when dry. *Leaves* 3–7 by 1½–2½ in. (in one specimen of Wallich's 12 by 4 in.), coriaceous, opaque, greenish or brown above when dry, pale beneath; petiole $\frac{1}{4}$–$\frac{2}{3}$ in. *Cymes* shortly peduncled, much branched; bracts obsolete; pedicels $\frac{1}{2}$ in. *Calyx* very coriaceous, lobes rounded. *Corolla-tube* $\frac{1}{2}$ in., cylindric, swollen at the top; lobes falcately oblong, globose in bud. *Ovary* elongate-conical; style stout, stigma fusiform. *Follicles* not seen.—This is certainly very near *T. javanica*, Miquel, but differs in the longer pedicels, suppression of bracts, and in the corolla-tube being dilated not in the middle, but at the top, as also in the stigma not being 2-fid; the latter character is however a very deceptive one, as the tearing away of the stigma from the anthers often mutilates it. *T. sphærocarpa* of Java is another close ally.

4. **T. hirta,** *Hook. f.*; cymes pubescent, leaves elliptic-ovate or -oblong long acuminate, nerves 10–15 pairs arched, cymes peduncled many-fld.

MALACCA; *Maingay.*

Leaves 4–8 in., coriaceous, almost caudate, base acute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cymes* almost hirsute, with short close-set spreading hairs, peduncle branches and pedicels stout. *Calyx* coriaceous, sometimes 7-lobed, lobes semicircular, eglandular. *Corolla* glabrous, tube $\frac{1}{2}$ in., stout, cylindric; lobes short, globose in bud. *Ovary* elongate; style slender, top urn-shaped, stigma small fusiform. *Follicles* strongly recurved, 1–1½ by $\frac{1}{2}$–$\frac{2}{3}$ in., terete, not ribbed keeled or beaked. *Seeds* $\frac{1}{3}$ in., few or many.—The specimens are very indifferent of this very distinct species.

†† *Branches rather slender; leaves membranous; calyx small; corolla-tube slender.*

5. **T. coronaria,** *Br. in Hort. Kew.* ed. 2, ii. 72; glabrous, leaves in each pair unequal elliptic-oblong obovate or oblanceolate obtusely acuminate or caudate, peduncles solitary or in pairs in the forks of the branches dichotomous 1–8-fl., corolla-tube swollen below the middle, follicles recurved. *A. DC.*

Prodr. viii. 373; *Roxb. Fl. Ind.* ii. 23; *Wall. Cat.* 1568; *Wight Ic.* t. 477; *Brand. For. Fl.* 322; *Dalz. & Gibs. Bomb. Fl.* 144; *Bedd. For. Fl. Anal. Gen.* 159; *Lodd. Bot. Cab.* t. 406. T. divaricata, *Blume Bijd.* 1026; *Kurz For. Fl.* ii. 174. Nerium divaricatum, *Linn. Sp. Pl.* 306. N. coronarium, *Jacq. Coll.* i. 138, t. 52; *Bot. Mag.* t. 1861.—Jasminum zeylanicum, &c., *Burm. Fl. Ind.* t. 39.

Cultivated throughout INDIA; from the N.W. Himalaya in Kumaon, eastwards and southwards.—Native country unknown.

A shrub, 6–8 ft., much dichotomously branched, bark pale. *Leaves*, the larger 4–6 by 1–1½ in., glossy, rather coriaceous, green when dry, pale beneath, margins waved, nerves 6–8 pairs, narrowed into a petiole ¼–½ in., axils of petioles glandular. *Peduncles* 1–2 in., pedicels slender; bracts 0 or minute. *Flowers* pure white, often double, fragrant. *Calyx-lobes* broadly ovate, acute. *Corolla-tube* ½–1 in., glabrous, dilated slightly below the middle, limb 1–1½ in. diam.; lobes obliquely ovate, obtuse, margins curled; mouth with 5 glands. *Anthers* inserted below the middle of the tube. *Ovary* glabrous. *Follicles* 1–3 in., spreading and recurved, sessile or contracted into a sort of stalk at the base, turgidly oblong, beaked or not, 3-ribbed. *Seeds* 3–6, oblong, striated; aril red, fleshy.

6. **T. graciliflora,** *Wall. Cat.* 1576, and *in Bot. Reg. under* t. 1273; glabrous, leaves oblong-lanceolate obtusely acuminate or caudate, nerves 11–16 pairs, cymes very long-peduncled, bracts obsolete, corolla-tube 1 in. very slender, lobes narrow, follicles ⅓ in. turgid 1–2-seeded. *Kurz For. Fl.* ii. 175. T. Colignonæ, *Van Heurck & Muell. Pl. Nov. Van Heurck*, 170.

MARTABAN and MOULMEIN; *Wallich, Griffith.*

Branches with pale bark. *Leaves* 4–7 by 1–2 in., membranous, narrowed into a slender petiole ¼–½ in. *Peduncle* sometimes equalling the leaves; branches of cyme slender, divaricate, pedicels short. *Calyx* very small; lobes rounded, ciliolate. *Corolla-tube* dilated above the middle, twice as long as the lobes. *Ovary* of two very slender carpels; style filiform, tip obconic, stigma forked. *Follicles* turgid, smooth, with a short upcurved beak or 0. *Seeds* ¼ in.

7. **T. subcapitata,** *Wall. Cat.* 1579, and *in Bot. Reg. under* t. 1273; leaves elliptic-oblong or lanceolate obtusely acuminate or caudate nerves 8–12 pairs, cymes shortly peduncled small many-fld., bracts obsolete, corolla-tube ⅓ in., lobes small rounded, throat villous. *A. DC. Prodr.* viii. 373.

TAVOY; *Gomez.* PEGU and TENASSERIM (*Kurz*). MERGUI; *Griffith.*

An evergreen shrub. *Leaves* 4–7 by 1½–3 in., very membranous, midrib and nerves slender; petiole slender, ¼–⅔ in. *Peduncle* 1–1½ in.; branches crowded, dichotomous, very short. *Calyx* small; lobes broadly ovate, obtuse. *Flowers* white. *Corolla* rather funnel-shaped above, lobes about half as long as the tube. *Ovary* ovoid, acute; style filiform, tip clavate, stigma fusiform. *Follicles* "obliquely oblong, about ⅔ in. long, narrowed into a thick long stalk and compressed into a sterile truncate appendage, terminating in a falcate point; glabrous, 1–2 seeded," *Kurz.*

8. **T. peduncularis,** *Wall. Cat.* 1575, and *in Bot. Reg. under* t. 1273; glabrous, leaves oblong-lanceolate obtusely caudate-acuminate, nerves 12–20 pairs spreading, peduncles very long and slender, cyme-branches divaricate, pedicels capillary, corolla-tube ⅓ in. curved limb small, follicles ½ in. stipitate 1-seeded. *A. DC. Prodr.* viii. 376.

PENANG; *Porter, Maingay* (Kew Distrib. 1060/2).

A small shrub. *Leaves* 4–6 by 1½–2½ in., membranous, nerves close, tips usually very long, base acute; petiole slender, ¼–⅓ in. *Peduncle* 4–5 in., wiry; branches few, filiform, widely divaricate. *Calyx* small, lobes rounded. *Corolla-lobes* very small, mouth glabrous. *Ovary* of two long narrow carpels; style filiform, top clavate, stigma 2-fid. *Follicles* turgid, obtusely beaked, not ribbed.

** *Calyx* 5-partite, segments eglandular or glandular at the base.

† *Calyx-segments broad, foliaceous, deciduous.*

9. **T. crispa,** *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 24; glabrous, leaves elliptic or elliptic-oblong or -obovate obtusely acuminate margins wrinkled, cymes long-peduncled, bracts minute, sepals rounded subacute. *A. DC. Prodr.* viii. 371, *excl. syn. Rheede & Linnæus*; *Wall. Cat.* 4450; *Wight Ic.* t. 470; *Bedd. For. Fl. Anal. Gen.* 159. T. alternifolia, *Roxb. Fl. Ind.* ii. 24; *Kurz For. Fl.* ii. 174, *not of Linnæus.*

ANDAMAN ISLANDS; frequent along the coast, *Kurz.*

Habit and foliage of *T. coronaria*, but leaves often much larger, sometimes 10 by 5 in., with more numerous and more spreading nerves; petiole very short. *Cymes* many-fld.; peduncle 1–4 in.; pedicels long, $\frac{1}{4}$–1 in. *Sepals* $\frac{1}{6}$ in. diam., obtuse or apiculate, sometimes cordate. *Corolla-tube* very slender, $\frac{1}{2}$–$\frac{3}{4}$ in., swollen at the top; limb 1 in. diam., lobes obovate, margins crisped, ovoid and acute in bud. *Ovary* ovoid, narrowed into the slender style, which is elongate, urceolate at the top, with a 2-fid stigma. *Follicles* "1 in., sessile, acute, recurved, ventrally 3-keeled, 3–6-seeded" (*Roxburgh*).—This species, which differs from all others in the remarkable calyx, has long been in confusion, and though cultivated in India from a very early period, it was only quite lately that its native country was known. This is the Andaman Islands. Beddome indeed says that it is common in the Western Ghats; but I have seen no specimens and suspect some error. Roxburgh accurately describes it, but strangely confounded it with *T. alternifolia* of Linnæus (*Sp. Pl.* 211). Under the latter plant (*Fl. Ind.* ii. 25) he quotes Linnæus' and Rheede's *Curata pala*, and says "the leaves being in this opposite, made me change the Linnæan specific name *alternifolia* for *crispa*, on account of its curled petals." A glance at Rheede's figure of *Curata pala*, upon which Linnæus founded his *T. alternifolia*, shows that it has nothing to do with this, but is probably *T. coronaria*. Kurz, also neglecting to refer to Rheede, restores the Linnæan name of *alternifolia*, and does not even refer to Roxburgh's *crispa*, though his description perfectly agrees with that author's. Lastly, Linnæus and Roxburgh are both wrong in the citation of Rheede for *Curata pala*: it is part i. t. 47 (Linnæus say 45, and Roxburgh 46).

†† *Calyx-segments narrow, acute or acuminate, persistent.*

10. **T. recurva,** *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 26; glabrous, leaves elliptic-oblong obtusely acuminate subcaudate, cymes short-peduncled recurved few- or many-fld., bracts subulate persistent, sepals very unequal lanceolate ciliolate, corolla-tube slender swollen above, follicles turgid many-seeded. *A. DC. Prodr.* viii. 371; *Wall. Cat.* 1569, and *in Bot. Reg. under* t. 1273; *Wight Ic.* t. 476; *Kurz For. Fl.* ii. 174. T. gratissima, *Lindl. in. Trans. Hort. Soc.* vii. pt. i. 55, and *Bot. Reg.* t. 1084.

CHITTAGONG; *Roxburgh*; Flagstaff Hill, *J. D. H. & T. T.* PEGU and TENASSERIM (*Kurz*).

A small shrub; bark smooth. *Leaves* 2–6 by 1–2$\frac{1}{2}$ in., membranous; nerves 6–8 pairs, slender, arched; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Cymes* with stout peduncle $\frac{1}{4}$–1 in., branches stout; bracts rather persistent; flowers drooping, fragrant. *Sepals* $\frac{1}{3}$–$\frac{1}{6}$ in. *Corolla-tube* $\frac{3}{4}$ in.; limb 1–1$\frac{1}{2}$ in. diam., lobes falcately obovate, forming an ovoid acute bud. *Ovary* elongate, narrowed into the filiform style with oblong tip and forked stigma. *Follicles* $\frac{1}{2}$–2 in., sessile, hardly recurved, very turgid, terete, not keeled.

11. **T. rostrata,** *Wall. Cat.* 1578, and *in Bot. Reg. under* t. 1273; glabrous, leaves elliptic-oblong or -lanceolate obtusely acuminate pale beneath, cymes short-peduncled, bracts persistent, sepals ovate acute, corolla-tube swollen in the middle, follicles sessile lanceolate long-beaked acutely keeled few-seeded. *A. DC. Prodr.* viii. 371; *Kurz For. Fl.* ii. 174.

AVA; banks of the Irawaddy, *Wallich.*

Shrubby, bark smooth. *Leaves* 3–6 by 1$\frac{1}{2}$–2 in., membranous; nerves 7–10 pairs,

slender. *Cymes* few-fld., peduncle ¼–1 in., bracts small, pedicels very short. *Sepals* small, $\frac{1}{10}$ in. *Corolla-tube* 1 in., very slender, lobes falcately linear-oblong. *Filaments* slender. *Ovary* narrowed into a style much shorter than the tube, stigma large, 2-partite. *Follicles* ½–1 by $\frac{1}{6}$–½ in., 2–4-seeded, beak straight or upcurved.

12. **T. calycina,** *Wall. Cat.* 1577, and *in Bot. Reg. under* t. 1273; glabrous, leaves elliptic-lanceolate obtusely acuminate, cymes short-peduncled, bracts subulate persistent, sepals linear-lanceolate acuminate very unequal, corolla-tube swollen above, ovary very short. *Kurz For. Fl.* ii. 173.

TENASSERIM; *Gomez.*

Foliage similar to that of *T. rostrata*, but petioles rather longer; pedicels very short indeed; bracts sometimes linear-oblong and almost leafy in texture; sepals very much longer, one-third as long as the corolla-tube, which is very slender, ⅔ in. long and swollen at the top; ovary not elongate, but almost hemispheric.—I have seen but one specimen.

13. **T. malaccensis,** *Hook. f.*; glabrous, leaves elliptic-obovate or -lanceolate obtusely acuminate or caudate, cymes sessile or shortly peduncled few-fld., pedicels slender, bracts 0, sepals unequal subulate-lanceolate acuminate, corolla-tube slender inflated at the top, lobes narrow, follicles turgid recurved beaked 3-keeled few- or many-seeded.

MALACCA; *Griffith, Maingay* (Kew Distrib. 1061, 1062).

A small shrub. *Branches* slender, very smooth. *Leaves* in flowering specimens 3–4 by 1–1½ in., very membranous, in the fruiting specimens shorter and broader in proportion sometimes nearly orbicular; nerves very slender, 6–8 pairs; petiole ¼ in. *Cymes* very slender and few- or many-flowered, pedicels ¼–1 in.; flowers small. *Corolla-tube* ⅔ in., lobes about as long, crumpled. *Ovary* short, top rounded; style long, filiform. *Follicles* ¾–1½ in., more or less recurved.

14. **T. membranifolia,** *Kurz For. Fl.* ii. 175; glabrous, leaves elliptic-lanceolate caudate-acuminate very membranous, not paler beneath, cymes subsessile, bracts obsolete, sepals very small subulate, corolla-tube very slender inflated below the middle, lobes linear-lanceolate much shorter than the tube.

MARTABAN; forests east of Toungboo, *Kurz.*

An evergreen shrub, 3–4 ft. (*Kurz*). *Leaves* 3–5 by 1–1¼ in., tips very long, curved, nerves 7–8 pairs, very slender. *Cymes* short, many-flowered; pedicels long or short. *Sepals* subequal. *Corolla-tube* ¾ in., lobes linear-lanceolate, acute, half as long as the tube or less, forming very long narrow buds. *Ovary* ovoid, acute; style filiform, top elongate-clavate, truncate, stigma slender. *Follicles* not seen.

DOUBTFUL AND EXCLUDED SPECIES.

T. FINLAYSONIANA, *Wall. Cat.* 4452, without flower or fruit, is probably a native of Siam, and is indeterminable.

T. INDICA, *Willd. Herb. in Steudel Nomenclator*, cannot be determined without a reference to Willdenow's herbarium.

T. MACROCARPA, *Jack.*, is a native of Sumatra; and T. MONOCARPA, *Steudel Nomenclator*, is obviously a misprint for the same.

T. PERSICARIÆFOLIA, *Willd.*, *Roxb. Fl. Ind.* ii. 27, is a Mauritian plant.

T. OPHIORHIZOIDES, *Kurz For. Fl.* ii. 175; a glabrous shrub, 2–4 ft., leaves 3–5 in. obovate-oblong to broadly lanceolate shortly acuminate sessile or tapering into a petiole of 2–3 lines membranous pale beneath, cymes 2–3 rarely more in the forks of the upper branches, subsessile or shortly peduncled few-fld., pedicels 1–1½ lines, bracts and bractlets minute deciduous, calyx 5-cleft very short, segments hardly 1 line lanceolate acute, corolla-tube about 4 lines rather thick, apex inflated, lobes hardly half as long as the tube.—Hill forests of Martaban, alt. 3–5000 ft. frequent.—I have seen no specimen.

T. WALLICHIANA, *Steudel Nomenclator* (T. parvifolia, *Roxb. Fl. Ind.* ii. 25; *Wight Ic.* t. 393, *by error* pauciflora *in letterpress*), is a native of Sumatra.

20. **PARSONSIA,** *Br.*

Twining shrubs. *Leaves* opposite. *Flowers* small, white, in terminal or axillary dichotomous cymes or thyrsi. *Calyx* 5-partite, glandular within or naked, or with 5 scales. *Corolla* salver-shaped, tube short, cylindric or globose, throat naked; lobes overlapping to the right. *Stamens* inserted in the tube, filaments often twisted; anthers half-exserted, acute, conniving over and adhering to the stigma, cells spurred and empty below. *Disc* of 5 lobes or scales. *Ovary* 2-celled; style filiform, top dilated, truncate, stigma columnar or elongate-conical, cells many-ovuled. *Fruit* cylindric, carpels at length separating from the two placentas. *Seeds* linear or oblong, tip narrowed and penicillate, albumen scanty; cotyledons linear-oblong, flat, radicle superior.—DISTRIB. 12 species of tropical Asia, Australia and New Zealand.

P. spiralis, *Wall. Cat.* 1631; quite glabrous, leaves ovate oblong or oblong-lanceolate base acute rarely rounded or cordate, cymes axillary corymbose. *A. DC. Prodr.* viii. 402; *Kurz For. Fl.* ii. 180. P. oblonga, *Wall. Cat.* 1632; *A. DC. l. c.* P. pauciflora *and* P. acuminata, *Wall. Cat.* 1633, 1634. Helygia javanica, *Blume Bijd.* 1043. Heligme javanica, *A. DC. l. c.* 425. H. Rheedei, *Wight Ic.* t. 1303; *Dalz. & Gibs. Bomb. Fl.* 146. H. spiralis, *Thwaites Enum.* 193. Spirostemon spiralis, *Griff. Notul.* iv. 80, t. 411, fig. 1. Aganosma concanensis, *Hook. Ic. Pl.* t. 841.

SILHET; *Wallich.* PEGU, TENASSERIM, MALACCA, SINGAPORE and PENANG. WESTERN GHATS; from the Concan southwards. CEYLON, ascending to 3000 ft.—DISTRIB. Malay Archipelago, China.

An evergreen twiner. *Leaves* 3–7 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., coriaceous, pale when dry; nerves 6–8 pairs, arched; petiole $\frac{1}{2}$–1 in. *Cymes* 2–3 in. diam.; peduncle stout, half as long as the leaves; bracts small. *Sepals* ovate, very thick, obtuse, equalling the corolla-tube. *Corolla* $\frac{1}{2}$ in. diam., coriaceous; lobes linear-oblong, obtuse. *Fruits* 7 by $\frac{3}{4}$ in., or shorter, elongate, linear-lanceolate, acuminate, quite cylindric, at length separating into 2 coriaceous follicles. *Seeds* $\frac{3}{4}$ in., slender, glabrous; coma as long.

TRIBE III. **ECHITIDEÆ.**

21. **VALLARIS,** *Burm.*

Twining shrubs. *Leaves* opposite, minutely dotted. *Flowers* white, in subaxillary or axillary or supra-axillary dichotomous cymes, or fascicled. *Calyx* 5-partite, glandular or not within, segments narrow. *Corolla* salver-shaped, tube short, throat naked; lobes broad, overlapping to the right. *Stamens* at the top of the tube, filaments very short clavate; anthers exserted, conniving in a cone adherent to the stigma, connective with a large dorsal gland, cells with rigid basal spurs. *Disc* various. *Carpels* 2, at first connate, many-ovuled; style filiform, pubescent, stigma thick obscurely annulate. *Fruit* oblong, acuminate, carpels at length separating. *Seeds* 2-seriate, ovate, acuminate or beaked, compressed, tip comose, albumen scanty; cotyledons flat thin, radicle superior.—DISTRIB. Species 5 or 6, tropical Asiatic and Malayan.

* *Flowers cymose. Twining shrubs.*

1. **V. Heynei,** *Spreng. Syst.* i. 635; leaves elliptic or oblong or linear-oblong acuminate pellucid-dotted, cymes pubescent. *A. DC. Prodr.* viii. 400; *Dalz. & Gibs. Bomb. Fl.* 144. V. dichotoma, *Wall. Cat.* 1621; *Griff. Notul.* iv. 77; *A. DC. l. c.*; *Thwaites Enum.* 192; *Brand. For. Fl.* 327; *Kurz For. Fl.* ii. 181; *Wight Ic.* t. 438. Echites dichotoma, *Roxb. Fl. Ind.* ii. 19. Peltanthera solanacea, *Roth Nov. Sp.* 132.

TROPICAL HIMALAYA; Nipal, *Wallich*; Kumaon, ascending to 5000 ft., *Edgeworth.* DECCAN PENINSULA; from the Concan southwards. SILHET, BIRMA, CEYLON. (Commonly cultivated in India).

A tall climbing shrub, bark pale; the axils of the petioles glandular. *Leaves* 1½–4 by ¾–1½ in., glabrous or pubescent, petiole ⅓–⅔ in. *Cymes* 3–10-fld., sessile or peduncled, dichotomous, much shorter than the leaves, sometimes racemose with a twining rachis; peduncles and pedicels slender, the latter often decurved; flowers pure white, ⅔ in. diam., fragrant. *Sepals* ovate-oblong, obtuse, equalling the short corolla-tube. *Corolla-limb* spreading. *Disc* ciliate. *Filaments* linear, villous; anthers woolly. *Style* pubescent. *Follicles* 6 by 2 in., straight, tapering from a rounded base to a stiff point, "splitting into 4 valves when dry" (*Roxb.*); pericarp thick, fibrous. *Seeds* 1 in., ovate, beaked, with a tuft of hairs at the hilum; coma very long.—I have seen no seeds; Kurz states that the follicles are always solitary.

2. **V. Pergulana,** *Burm. Fl. Ind.* 81; leaves large broadly elliptic or obovate or rounded abruptly shortly acute membranous, cymes glabrous or puberulous.—*A. DC. Prodr.* viii. 399; *Wight Ic.* t. 429; *Hook. Ic. Pl.* t. 153 (V. Pergularia *by error*). V. ovalis, *Miquel Fl. Ind. Bat.* ii. 427. Pergularia glabra, *Linn. Mant.* 53. Emericia Pergularia, *Roem. & Sch. Syst.* iv. 401. Echites hircosa, *Roxb. Fl. Ind.* ii. 18.—*Rumph Amb.* v. 51, t. 29, fig. 2.

BENGAL; scarce, *Roxburgh.* MALACCA; cultivated, *Maingay.* CEYLON (*Thwaites*).—DISTRIB. Java, Malay Islands, Timor.

A climbing shrub; bark pale; axils of the petioles glandular. *Leaves* 4–7 by 3–4 in., glabrous or puberulous beneath; petiole 1–1½ in. *Cymes* much more lax-flowered and glabrous than in *V. Heynei.* *Flowers* with a disagreeable goat-like smell. *Sepals* ovate-lanceolate, acute.—Thwaites doubts this being distinct from *P. Heynei*, which makes me doubt his having the true plant in Ceylon. Miquel's *V. ovalis* is undoubtedly the same species, as an examination of Horsfield's specimens, on which it was founded, proves. I doubt the species being British Indian. I have seen no native specimens, and Roxburgh's habitat of Bengal is not confirmed.

** *Flowers fascicled. Shrubs not twining.*

3. **V. Maingayi,** *Hook. f.*; branches stout, bark black, leaves very coriaceous elliptic-lanceolate obtusely acuminate shining above, nerves 5–6 pairs, corolla ½ in. diam., lobes obliquely ovate obtuse puberulous, mouth contracted puberulous.

MALACCA; *Maingay* (Kew Distrib. 1084).

A large tree (*Maingay*). *Branches* curving, bark closely ringed with cracks. *Leaves* 3–4½ by 1–1½ in., tapering at both ends, very dark brown above, pale brown beneath, nerves strong but not prominent, black when dry; petiole very short, black. *Flowers* 4–8 in a small peduncled fascicle; pedicels very unequal, ⅙–½ in., rather stout. *Sepals* broadly ovate, 2 outer eglandular, 3 inner with 5 glands in all (*Maingay*). *Corolla-tube* much longer than the sepals, ½ in. long, swollen in the middle, mouth much contracted, hairy within; lobes not much twisted in bud, but strongly overlapping. *Anthers* half-exserted, with a large subcordate gland at the base behind, villous opposite to it in front. *Disc* of broad rounded glabrous glands. *Ovary* hairy towards the tip; style slender, top slightly dilated. *Fruit* unknown.

4. **V. lancifolia,** *Hook. f.*; branches slender, bark pale, leaves narrowly lanceolate acuminate, nerves very numerous close and slender, corolla ¼ in. diam., lobes obliquely foliate obtuse, mouth broad villous.

MALACCA; *Maingay* (Kew Distrib. 1102).

A much branched woody shrub, apparently erect and not twining; branches tubercled with lenticels, twigs smooth. *Leaves* 2–3 by ¼–½ in., narrowed at both ends, much so to the very slender points, pale brown, rather membranous; petiole slender, ¼–⅓ in. *Flowers* 3–5 on a very short axillary peduncle; pedicels very slender, ¼ in., with minute bracts at the base. *Sepals* triangular, very small, ciliolate, minutely

glandular at the base (*Maingay*). *Corolla-tube* funnel-shaped, 1/12 in. long, limb 1/4 in. diam., lobes inflexed at the tip in bud. *Anthers* half-exserted, with a narrow lanceolate gland on the back.

DOUBTFUL SPECIES.

V. ASSAMICA, *Griff. Notul.* iv. 77; this agrees fairly well with the character of *V. Heynei*, but I find no specimens of this species in Griffith's herbarium from Assam. His habitat is woods at Bishenath.

V.? ANCEPS, *Wall. Cat.* 1622; *A. DC. Prodr.* viii. 400 (*without description*); from Tavoy. This is not a *Vallaris*, but is in too imperfect a state for determination. Kurz (Journ. As. Soc. 1877, ii. 254) says that it seems hardly referable to *Apocyneæ*.

22. POTTSIA, *Hook. et Arn.*

An evergreen climber. *Leaves* opposite, nerves distant. *Flowers* in lax terminal and axillary panicled cymes. *Calyx* small, 5-partite, glandular within. *Corolla* salver-shaped, tube cylindric; throat constricted, naked; lobes overlapping to the right. *Stamens* at the top of the tube, filaments hairy; anthers exserted, sagittate, conniving over and adhering to the stigma, cells with basal empty spurs. *Disc* deeply 5-fid, lobes lanceolate, much longer than the ovary. *Carpels* 2, distinct, villous, many-ovuled, included in the disc; style slender, thickened in the middle and top, stigma conical. *Follicles* elongate, slender, beaded. *Seeds* linear, elongate, coma deciduous, albumen copious; cotyledons linear, flat, radicle superior.—DISTRIB. Species 2 or 3, Eastern Asiatic and Malayan.

P. cantonensis, *Hook. & Arn. Bot. Beech. Voy.* 199, t. 43; *Benth. Fl. Hongk.* 222; *Kurz For. Fl.* ii. 190. P. Hookeriana, *Wight Ic.* t. 1306 bis. P. ovata, *A. DC. Prodr.* viii. 442. Parsonsia ovata, *Wall. Cat.* 1630. Teysmannia laxiflora *and* Hookeriana, *Miquel Fl. Ind. Bat.* ii. 455, 456, *and* Parapottsia, *Addenda*, 1080. Vallaris laxiflora, *Blume Bijd.* 1043. Euthodon paniculata, *Griff. Notul.* iv. 84; *Ic. Pl. Asiat.* t. 458, fig. 2.

SILHET; *De Silva.* ASSAM; *Jenkins.* CACHAR; *Keenan.* TENASSERIM; *Kurz.* MALACCA; *Maingay.*—DISTRIB. Java, S. China.

Branches slender, smooth, cylindric; twigs puberulous. *Leaves* 3–4 by 1½–2 in., elliptic-ovate or ovate, acuminate, base rounded or subcordate, nerves 4–6 pairs; petiole slender, 1–1½ in. *Cymes* drooping, long-peduncled, very many-fld.; branches slender, ultimate with racemose flowers; pedicels slender, ½ in.; bracts minute, ovate. *Sepals* broadly ovate, obtuse. *Corolla* 1/4–1/3 in., glabrous, rose-coloured, tube broad obtusely angled, lobes short ovate. *Follicles* 1 ft., flexuous, smooth, thinly coriaceous. *Seeds* 1 in., very slender, glabrous, coma as long.—Griffith in his generic character of *Euthodon* describes the throat of the corolla as without scales; in the specific he mentions 5 glands in the sinus of the lobes; these I do not find in his specimens.

23. WRIGHTIA, *Br.*

Shrubs or small trees, with often slender cord-like branches. *Leaves* opposite. *Flowers* red, white or yellow, in terminal or subaxillary sessile cymes. *Calyx* short, 5-partite, with glands or scales inside. *Corolla* salver-shaped, tube cylindric, usually short, throat with 1–2 series of usually fimbriate scales; lobes overlapping to the left. *Stamens* at the top of the tube, filaments short dilated; anthers exserted, sagittate, conniving around and adhering to the stigma, cells spurred at the base. *Disc* 0. *Carpels* 2, free or connate, many-ovuled; style filiform, stigma ovoid with usually a toothed basal ring. *Follicles* linear, erect, connate or distinct. *Seeds* linear, compressed, tip narrowed naked, base with a deciduous coma, albumen scanty or 0; cotyledons broad, convolute, radicle

short, superior.—DISTRIB. Species about 12, tropical African, Asiatic and Australian.

W. religiosa, *Benth. in Gen. Pl.* ii. 713 (Echites religiosa, *Teijsm. & Binnend. Hort. Bogor.* 126); cultivated at Malacca (*Herb. Maingay*), is a native of Siam. It is a small tree with elliptic leaves ½–1½ in. long, capillary peduncles and pedicels, and small flowers without coronal scales.

* *Calyx-segments half the length of the short corolla-tube or shorter.*

1. **W. tinctoria,** *Br. in Mem. Wern. Soc.* i. 73; glabrous, leaves elliptic-ovate or -lanceolate or obovate-oblong obtusely acuminate or caudate, coronal scales fimbriate. *A. DC. Prodr.* viii. 406; *Wall. Cat.* 1625; *Wight Ic.* t. 444; *Dalz. & Gibs. Bomb. Fl.* 145; *Brand. For Fl.* 324; *Grah. Cat. Bomb. Pl.* 114; *Kurz For. Fl.* ii. 193; *Bedd. Fl. Sylv.* t. 241; *Bot. Reg.* t. 933. Nerium tinctorium, *Roxb. Hort. Beng.* 19, and *Fl. Ind.* ii. 4.

CENTRAL INDIA and throughout the WESTERN PENINSULA. BIRMA (*Kurz*).—DISTRIB. Timor (*Herb. Mus. Paris*).

A small tree, twigs glabrous or puberulous. *Leaves* 3–5 by 1–1½ in.; nerves 6–12 pairs, faint till the leaves are old, then strong beneath; base acute or rounded; petiole very short. *Cymes* sometimes 5 in. diam., with slender spreading dichotomous branches; bracts minute; flowers white, ½–¾ in. diam. *Sepals* ovate, obtuse. *Corolla-lobes* linear-oblong, scales linear scattered. *Stamens* large. *Follicles* 6–18 in. or more, cylindric, slender, smooth, tips adhering. *Seeds* ⅗ in., glabrous except for the coma, linear.—Foliage very variable. I have seen no Birmese specimen. The Timor plant is undoubtedly the same.

VAR. *Rothii*; branches and leaves beneath puberulous. W. Rothii, *G. Don Gen. Syst.* iv. 86; *A. DC. Prodr.* viii. 406; *Wight Ic.* t. 1319. W. tinctoria, *Roth Nov. Pl. Sp.* 121.—Deccan Peninsula.

2. **W. angustifolia,** *Thwaites Enum.* 193; glabrous, leaves lanceolate obtuse, coronal scales ligulate tips lacerate. *Beddome For. Fl. Anal. Gen.* 160.

CEYLON; Dambool and Trincomalee, *Gardner*.

A small tree; branches slender. *Leaves* 1½–4 by ½–¾ in., almost black when dry, nerves 6–12 pairs; petiole very short. *Cymes* and flowers as in *W. tinctoria*, but the coronal scales very different, as long as the anthers, and laciniate at the tip only. *Fruit* unknown.

3. **W. tomentosa,** *Roem. & Schultes Syst.* iv. 414; densely tomentose, leaves elliptic caudate-acuminate, base acute, cymes many-flowered, corolla-lobes linear-oblong, coronal scales short obtuse entire or lobulate. *A. DC. Prodr.* viii. 404; *Wall. Cat.* 1628; *Wight Ic.* t. 443, and *Ill.* ii. t. 154; *Dalz. & Gibs. Bomb. Fl.* 145; *Brand. For. Fl.* 323; *Grah. Cat. Bomb. Pl.* 114; *Beddome For. Fl., Anal. Gen.* 159. W. mollissima, *Wall. Cat.* 1627; *Pl. Rar.* ii. t. 126; *Kurz For. Fl.* ii. 192. W. Wallichii, *A. DC. l. c.* 405; *Dalz. & Gibs. l. c.*; *Kurz l. c.*; *Wight Ic.* t. 1296; *Beddome l. c.* 160. W. Coraia, *Wall. Cat. under* 1615; *A. DC. Prodr.* viii. 407. W. Hamiltoniana, *Wall. Cat.* 4461. Hunteria eugenifolia, *Wall. Cat.* 1615. Nerium tomentosum, *Roxb. Fl. Ind.* ii. 6. N. Coraia, *Hb. Ham.* N.? tinctorium, *Hb. Ham.*—*Rheede Hort. Mal.* ix. t. 3, 4.

TROPICAL INDIA; from the Indus eastwards and southwards to Ceylon, Birma and Penang, ascending to 2000 ft. in the Himalaya, and to 4000 in the Nilgherries.

A small usually crooked deciduous-leaved tree, bark corky. *Leaves* 3–6 by 1½–2½ in., often tomentose on both surfaces, dark brown when dry, nerves 10–14 pairs; petiole ¼ in. *Cymes* peduncled, corymbose, many-fld.; flowers 1 in. diam., yellowish with orange coronal scales. *Sepals* half as long as the corolla-tube, rounded. *Corolla-lobes* linear- or obovate-oblong, coronal scales very variable. *Anthers* white. *Follicles* 6–12 by ⅓ in., connate into a cylinder, with a deep groove on each side till maturity, rough with tubercles. *Seeds* slender, ½–⅔ in., coma pure white.—There is

some obscurity about the colour of the flower of this species, possibly indicating different species, or a change during life. In Thwaites' figure of the Ceylon plant they are in one pale yellowish-red, in another of the same cyme a deep blue purple. In a drawing of Royle's they are nearly pure white, in another they are all pale rosy; in Wight's Illustrations (of *W. mollissima*) they are a dingy pale reddish. Brandis, who remarks on this subject and on the various accounts of the scent of the flowers, suggests that they may change colour after expansion.

4. **W. coccinea,** *Sims, Bot. Mag.* t. 2696; glabrous or pubescent, leaves elliptic or elliptic-lanceolate obtusely caudate-acuminate base acute, cymes few-fld., corolla-lobes rounded, coronal scales large broad rounded undivided. *A. DC. Prodr.* viii. 407; *Wall. Cat.* 1626; *Grah. Cat. Bomb. Pl.* 114; *Kurz For. Fl.* 193; *Lodd. Bot. Cab.* t. 894; *Wight Ic.* t. 442. Nerium coccineum, *Roxb. Fl. Ind.* ii. 2.

SILHET; *Roxburgh, De Silva.* CHITTAGONG HILLS (*Kurz*).—DISTRIB. Philippine Islds.

A timber tree; bark of shoots white, shining. *Leaves* 3–5 by 2–2¾ in.; membranous, dark brown when dry, nerves 6–12 pairs; petiole very short. *Cymes* 3–4 fld.; peduncle and pedicels very short; bracts large; flowers 1 in. diam., dark red. *Sepals* rounded, ¼ in. diam. almost as long as the corolla-tube. *Corolla* thick, almost fleshy; scales crimson, obscurely crenate. *Anthers* very hairy at the back. *Follicles* "linear, as thick as the little finger, glabrous, corky-lenticellate" (*Kurz*).

5. **W. lævis,** *Hook. f.*; glabrous, leaves elliptic or oblong caudate-acuminate shining above, cymes few-fld., corolla-lobes oblong, coronal scales fimbriate from the base.

MALACCA; Mt. Ophir, *Maingay* (Kew Distrib. 1065).

Branches slender, bark pale. *Leaves* 3–5 by 1–2 in., thin in texture; nerves 4–5 pairs, arched; petiole very short. *Cymes* puberulous, peduncled, pedicels rather stout; flowers about ⅓ in. diam. *Sepals* rounded, ciliolate. *Corolla* rather fleshy. *Follicles* 7–8 in., very slender. *Seeds* very long, 1½ in., slender, glabrous.

** *Calyx-segments much shorter than the corolla-tube.*

6. **W. zeylanica,** *Br. in Mem. Wern. Soc.* i. 73; glabrous, leaves elliptic or elliptic-lanceolate ovate or obovate acuminate, cymes axillary and terminal, coronal scales laciniate. *A. DC. Prodr.* viii. 407; *Thwaites Enum.* 193; *Gaertn. Carp.* ii. 172, t. 117; *Wall. Cat.* 4460; *Bedd. For. Fl. Anal. Gen.* 160. W. antidysenterica, *Br. l. c.*; *A. DC. l. c.* Nerium zeylanicum *and* antidysentericum, *Linn.* N. divaricatum, *Herb. Madr.*—*Burm. Fl. Zeyl.* 23, t. 12, fig. 2.

CEYLON; "common in the south of the island," *Thwaites.*

A small tree, branches dichotomous. *Leaves* 3–5 by 1½–2 in.; nerves 6–10 pairs; petiole very short. *Cymes* few-fld., shortly peduncled, glabrous. *Sepals* ovate, obtuse. *Corolla-tube* very slender, ¾–1 in., limb 1–1½ in. diam., white, puberulous, lobes obovate; coronal scales as long as the stamens. *Follicles* 7 in., pericarp thin. *Seeds* ¾ in. long, linear oblong.

24. **NERIUM,** *Linn.*

Erect glabrous shrubs. *Leaves* 3–4-nately whorled, rarely opposite, narrow, coriaceous; nerves slender, very close. *Flowers* large, in racemose cymes. *Calyx* 5-partite, glandular within, segments narrow. *Corolla* funnel-shaped, tube cylindric, throat campanulate with 5 broad toothed scales; lobes overlapping to the right. *Stamens* at the top of the tube, included, filaments short; anthers sagittate, conniving around and adhering to the stigma, tips filiform, cells with long spurs furnished with twisted hairs, appendages rigid. *Disc* 0. *Carpels* 2, distinct, many-ovuled; style filiform or thickened above the middle, stigma with a basal reflected lobed membrane surmounted by 5 tubercles, tip

subglobose. *Follicles* elongate, cylindric, straight, hard, appressed. *Seeds* oblong, villous, coma terminal caducous, albumen fleshy; cotyledons flat, thickish, radicle superior.—DISTRIB. Species 2 or 3, Mediterranean region, N. Asian and Japanese.

N. odorum, *Soland. in Hort. Kew.* ed. i. v. i. 297; flowers scented, appendages of the corolla cleft into 4–7 linear segments, spurs of anthers linear twice as long as the cells. *Boiss. Fl. Orient.* iv. 48; *A. DC. Prodr.* viii. 420; *Roxb. Fl. Ind.* ii. 2; *Brandis For. Fl.* 328; *Grah. Cat. Bomb. Pl.* 114; *Targ. Tozz. Rap.* 28, 29, t. 3; *Wall. Cat.* 1624; *Bot. Mag.* 1799, 2032; *Bot. Reg.* t. 74 (*fl. double*). N. odoratum, *Lamk. Encycl.* iii. 456. N. latifolium *and* N. indicum, *Mill l. c. ed.* 8.—*Rheede Hort. Mal.* ix. t. 1, 2.

WESTERN HIMALAYA; from Nipal westwards, ascending to 6500 ft. in Murree.—CENTRAL INDIA. SCIND.—DISTRIB. Affghanistan, Japan.

A large erect stout shrub. *Leaves* 4–6 in., linear-lanceolate, thickly coriaceous, acuminate, midrib very stout; nerves numerous, slender, horizontal; petiole very short. *Flowers* 1½ in. diam., sweet-scented, rose white or yellow. *Sepals* subulate-lanceolate. *Follicles* 6–9 in.—Very similar to and perhaps only a variety of the common *N. Oleander* of the Mediterranean region, which extends eastwards to Persia.

25. STROPHANTHUS, *DC.*

Small trees or shrubs, often climbing. *Leaves* opposite. *Flowers* usually large, in terminal cymes. *Calyx* 5-partite, glandular within. *Corolla* funnel-shaped, tube short, throat large, campanulate, with 10 free or connate scales; lobes overlapping to the right, produced into long or short tails, rarely ovate acute. *Stamens* at the top of the tube, included, filaments short; anthers sagittate, tips filiform, conniving around and adhering to the stigma, cells spurred at the base. *Disc* 0. *Carpels* 2, distinct, many-ovuled, glabrous; style filiform, rugose, with cellular papillæ, tip dilated, stigma columnar or conical, simple or 2-fid. *Follicles* oblong or elongate, hard, spreading (parallel in *S. Jackianus*). *Seeds* compressed, fusiform, narrowed into a feathery tail, or with a sessile coma, base with a deciduous tuft of hairs.—DISTRIB. Species about 18, tropical Asiatic and African, and 1 S. African.

* *Lobes of the corolla exceeding the throat in length.*

1. **S. dichotomus,** *DC. in Bull. Soc. Phil.* iii. 123; glabrous, leaves elliptic-oblong or obovate obtuse acute or apiculate, cymes few-fld., tails of corolla-lobes 5–7 in. *A. DC. Prodr.* viii. 417; *Miquel Fl. Ind. Bat.* ii. 441. S. scandens, *Roem. & Sch. Syst.* iv. 412. L. longicaudatus *and* Griffithii, *Wight Ic.* t. 1299, 1300; *Kurz For. Fl.* ii. 191. S. pentaphyllus, *Griff. Notul.* iv. 78. S. caudatus, *Kurz in Journ. As. Soc.* 1877, ii. 257. S. Horsfieldianus, *Miquel Fl. Ind. Bat.* ii. 442. Echites caudata, *Burm. Fl. Ind.* 68, t. 26. Nerium caudatum, *Lamk. Dict.* N. scandens, *Lour. Fl. Coch.* i. 143 (*ex A. DC.*).

TENASSERIM (*Kurz*). MALACCA; *Griffith, Maingay.* SINGAPORE and PENANG (drawings).—DISTRIB. Java.

An erect shrub. *Branches* stout; bark dark, dotted with lenticels. *Leaves* 3–5½ by 2–3 in., rather coriaceous, glossy above; nerves 6–8 pairs, spreading, arching and joining far within the margin; petiole ¼ in. *Cymes* much shorter than the leaves, dichotomous. *Sepals* subulate from an ovate base. *Corolla-tube* and *throat* ¾–1 in. long, whitish, tails purple; scales cleft to the base. *Anther-tips* very long and slender. *Follicles* not seen (as taken from a drawing, very large, divergent, 8 by 2 in., broadest at the very base where united, tapering to a broad rounded point, terete smooth green).

2. **S. Wallichii,** *A. DC. Prodr.* viii. 418; glabrous, leaves elliptic oblong or obovate acuminate cuspidate or obtuse, cymes many-fld., tails of corolla-

lobes 2–3 in. S. dichotomus, *Wall. Cat.* 1641; *Wight Ic.* t. 599; *Lodd. Bot. Cab.* t. 759; *Grah. in Maund. Bot.* iii. t. 150. S. dichotomus, γ coromandelianus, *Ker in Bot. Reg.* t. 469 *in obs.* ? S. caudatus, *Kurz For. Fl.* ii. 193. Nerium caudatum, *Roxb. Fl. Ind.* ii. 9; *Burm. Fl. Ind.* t. 26.

KHASIA MTS., *De Silva.* CHITTAGONG; at Seetakoond, *J. D. H. & T. T.* (*cult.*?). CIRCARS; on the mountainous parts of the coast, *Roxburgh.* ? TENASSERIM; *Kurz.*

A climber, bark lenticellate. *Leaves* waved, shining, 2–3 by 1½–2 in., rather thin, nerves 5–6 pairs; petiole ¼ in. *Cymes* sometimes 6 in. diam., spreading, loosely dichotomously branched from the base; branches slender; bracts ¼–⅓ in., narrowly lanceolate, spreading and recurved. *Sepals* subulate-lanceolate. *Corolla-tube* ½ in., swollen at the base, pink in Roxburgh's drawing and Kurz's description, yellow with faint reddish stripes in the figures of Maund and Loddiges. *Anther-tips* very long and slender.

** *Lobes of the corolla not or hardly exceeding the throat.*

3. **S. Wightianus,** *Wall. Cat.* 4459; quite glabrous, leaves elliptic obtuse, cymes many-fld., tails of corolla-lobes ¼–½ in. *Wight Ic.* t. 1301. Cameraria zeylanica, ?? *Hb. Wight* (*ex Wall. l. c.*).

MALABAR and TRAVANCORE; *Rottler*; near Quilon, *Wight.*

A climbing shrub, bark closely warted with lenticels. *Leaves* 2–3 by 1–1¾ in., thinly coriaceous, nerves 6–7 pairs; petiole very short. *Cymes* repeatedly dichotomously branched from the base, 2–3 in. high and broad, corymbiform; bracts and sepals ovate, acute. *Corolla-tube* ⅓–½ in. long; inflated at the base; lobes rather longer, gradually narrowing into the linear obtuse tail; scales very prominent. *Anther-tips* very long and slender. *Follicles* (from Wight's drawing) 6 by 1 in., of the shape of those of *S. dichotoma*, warted all over. *Seeds* with a long beak ending in a filiform longitudinally plumose bristle.

4. **S. brevicaudatus,** *Wight Ic.* t. 1302; quite glabrous, leaves elliptic or oblong finely acuminate margins crisped, corolla-lobes broadly ovate acute. *Kurz For. Fl.* ii. 191. Cercocoma singaporiana, *Wall. Cat.* 1623. *A. DC. Prodr.* viii. 432.

MALACCA; *Griffith, Maingay.* SINGAPORE; *Lobb.* MERGUI (? *Kurz*).—DISTRIB. Borneo.

A straggling shrub, branches minutely warted. *Leaves* 2–4 by 1–1½ in., dark brown when dry, opaque on both surfaces, nerves 6–8 pairs; petiole ¼–⅓ in. *Cymes* dichotomously branched from the base; branches stout, short; bracts (often numerous and empty) and sepals broadly ovate acute. *Corolla* almost salver-shaped; tube ⅓ in. long, limb about as broad. *Filaments* hairy; anthers with very slender points about equalling the cells. *Style* hairy. *Follicles* 8 by ⅝ in., base broad, middle slightly turgid, then tapering to a long hard point, terete, smooth. *Seeds* not ripe, shortly pilose at the lower end (*Maingay*).—Kurz states this species is reputed to grow at Mergui.

5. **S. Jackianus,** *Wall. Cat.* 1643; leaves linear-oblong obtusely acuminate scaberulously pubescent beneath, cymes axillary very few-fld., corolla-lobes ⅓ in. linear obtuse about equalling the broad subcylindric throat, seeds very slender. *A. DC. Prodr.* viii. 419.

PENANG; *Jack.*

Branches slender, with dark-brown bark, twigs scaberulous. *Leaves* 3–4 by 1–1½ in., minutely scaberulous above, nerves numerous; petiole very short. *Cymes* very shortly peduncled, 2–3-fld.; pedicels short; flowers nodding. *Sepals* ovate-lanceolate, acuminate. *Corolla* puberulous, tube hardly any, throat more cylindric than campanulate. *Follicles* a foot long, very slender, parallel, cylindric, 2-partite when ripe, the segments opening flat, pericarp thinly coriaceous, polished within. *Seeds* ½ in. long, narrowly fusiform, glabrous, coma white, three times as long.—I have seen

only Wallich's very mutilated flowers, shrivelled leaves, dehisced pods and seeds, which latter entirely resemble those of a *Wrightia*.

26. **APOCYNUM,** *Linn.*

Erect herbs or undershrubs. *Leaves* opposite. *Cymes* terminal and lateral; flowers small. *Calyx* 5-fid, eglandular within; lobes acute. *Corolla* campanulate, 5-fid, with 5 processes between the stamens; lobes overlapping to the right. *Stamens* near the base of the corolla, included; anthers sagittate, acute, conniving and adnate to the stigma, cells with basal spurs. *Disc* fleshy, 5-lobed. *Carpels* 2, distinct, many-ovuled, half sunk in the disc, to which they are adnate by the back; style short or 0, stigma subglobose, tip 2-lobed. *Follicles* slender. *Seeds* small, oblong, with a terminal caducous coma, albumen scanty, cotyledons flat.—DISTRIB. Species 5, of the north temp. zone.

A. venetum, *Linn.*; *A. DC. Prodr.* viii. 400; *Boiss. Fl. Orient.* iv. 48.

WESTERN TIBET; Shayuk valley, alt. 8000 ft. (without flower or fruit), *Thomson.* —DISTRIB. N. Asia, from the Caucasus to China, Persia, Asia Minor, Greece, Dalmatia.

Stem and branches slender, smooth, cylindric. *Leaves* 2–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., linear-oblong or oblong-lanceolate, apiculate, entire or crenulate; nerves very slender; petiole very short. *Cymes* small, erect, subcorymbose; bracts subulate. *Flowers* erect, $\frac{1}{3}$ in. diam., purplish, puberulous. *Carpels* with pubescent tips. *Follicles* 4 in. —Though I have seen neither flower nor fruit, I cannot doubt this being the common *A. venetum.*

27. **URCEOLA,** *Roxb.*

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* small, in dense corymbosely panicled cymes. *Calyx* 5-partite, eglandular within. *Corolla* urceolate or subglobose, throat naked; lobes short, valvate. *Stamens* at the base of the corolla; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* cupular or annular, truncate or 5-lobed. *Carpels* 2, distinct, longer than the disc, truncate, hirsute, many-ovuled; style short, top obconic; stigma subannulate, conoid. *Follicles* spreading, thick and acuminate, or elongate and contracted or not between the seeds. *Seeds* oblong or linear, compressed, villous, tip contracted bearded with long persistent brown hairs, and crowned with a long white deciduous coma, albumen scanty; cotyledons thin, radicle short.—DISTRIB. Species 7 or 8, Malayan.

SECT. I. **Urceola proper.** *Follicles* straight, even, horizontally divergent. *Calyx* longer than the corolla, 2 interior segments much smaller than the others.

1. **U. elastica,** *Roxb. in As. Res.* v. 167, *with figure* (*excl. fruit*); branches robust, leaves beneath and inflorescence finely rusty pubescent, leaves elliptic abruptly acuminate thickly coriaceous, nerves 10–12 pairs very strong, cymes very dense-fld., bracts subulate, calyx-segments lanceolate recurved, follicles cylindric. *A. DC. Prodr.* 358; *Wight Ic.* t. 473 (*excl. figures and descriptions of fruit*). Tabernæmontana elastica, *Spreng. Syst. Veg.* i. 639. ? Vahea gummifera, *Poir. Dict. Suppl.* v. 409.

MALACCA and PENANG; *Roxburgh, Wallich, Griffith, Maingay* (Kew Distrib. 1058, 1091).—DISTRIB. Sumatra.

A stout climber. *Leaves* 4–6 by 2–3 in., red-brown when dry, softly pubescent beneath, glabrous above with impressed nearly horizontal nerves; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* numerous, panicled at the ends of the branches, long-peduncled; flowers in compound corymbs, very densely packed. *Calyx* $\frac{1}{6}$ in. long, exceeding the ovoid pubescent corolla, which is glabrous within except a tuft of reflexed hairs between

the stamens. *Anthers* acuminate. *Style* obconoid, with a small conoid stigma. *Follicles* 6 by ½ in., quite straight, horizontal, cylindric, acuminate. *Seeds* linear, ¾ in., softly villous, coma copious, four times longer.—The fruit figured and described by Roxburgh, A. DC., and Wight as that of *U. elastica* is *Orchipeda fœtida*, Blume, a plant cultivated in India. Wallich's *U. elastica* (Cat. 1617), from Penang, is an Asclepiadeous plant without flower or fruit.

2. **U. Maingayi,** *Hook. f.*; quite glabrous except the inflorescence, leaves elliptic abruptly acuminate thickly coriaceous, pale beneath, nerves 6–10 pairs strong, cymes finely pubescent, calyx-segments oblong obtuse recurved, follicles cylindric.

SINGAPORE, *Maingay* (Kew Distrib. 1083).

Habit and brown colour of *U. elastica*, but the leaves are quite glabrous and apparently glaucous beneath, with fewer more arched nerves not impressed above. The cymes are smaller, fewer and laxer-flowered; the calyx-segments much broader and very obtuse; the anthers and style are the same in both, but the follicles are much more slender in *A. Maingayi.*

3. **U. lucida,** *Benth. in Gen. Pl.* ii. 716; quite glabrous except the inflorescence, leaves elliptic abruptly acuminate shining on both surfaces, nerves 8–12 pairs, cymes lax-fld. finely pubescent, bracts subulate, calyx-segments broadly oblong, follicles short gradually acuminate from a broad base. Chavannesia lucida, *A. DC. Prodr.* viii. 444. Echites? lucida, *Wall. Cat.* 1670.

PENANG; *Wallich.* ? MALACCA; *Griffith.* RANGOON; *McLelland.*

Branches slender; bark nearly black, smooth. *Leaves* 3–5 in., rigidly coriaceous, red-brown when dry; nerves arched, strong beneath; petiole slender, ½–1 in. *Cymes* long-peduncled; peduncle and branches very slender; bracts subulate; flowers very minute, $\frac{1}{10}$ in. long. *Corolla* as in the preceding species. *Anthers* truncate. *Ovary* hairy at the tip only; style elongate with an obconoid top surmounted by subulate stigma. *Follicles* 4 in. long, ⅓ in. diam. above the narrowed base, rigid, like poignards. *Seeds* ⅓–½ in., linear-oblong, silky, coma 4–5 times longer.—Griffith's plant is in very young flower and may be another species; it has larger leaves with fewer and very slender nerves. The Rangoon specimens have caudate-acuminate leaves, larger bracts and hispidulous flowers. Kurz (in Journ. As. Soc. 1877, ii. 255) refers this to *U. esculenta.*

4. **U. malaccensis,** *Hook. f.*; quite glabrous except the inflorescence, leaves elliptic or ovate-oblong obtusely caudate-acuminate coriaceous, nerves 4–6 pairs slender, cymes shortly peduncled dense-fld., bracts puberulous oblong obtuse, calyx-segments linear-oblong obtuse recurved, "follicles elongate filiform."

MALACCA; *Maingay* (Kew Distrib. 1098, ? 1082).

Branches smooth; bark dark brown. *Leaves* 2–4 by 1–1½ in., smooth on both surfaces; nerves arched, nervules obscure; petiole ¼–½ in. *Cymes* chiefly axillary; peduncle glabrous, shorter or longer than the leaves; bracts $\frac{1}{6}$–¼ in., recurved, much larger than in the foregoing species; flowers hoary rather than pubescent. *Corolla* as in the preceding species. *Anthers* obtuse. *Ovaries* hirsute; style obconic, surmounted with an obpyriform stigma. *Follicles* described by Maingay as "elongate filiform divaricate. *Seeds* oval, compressed, pilose at the apex."

5. **U. esculenta,** *Benth. in Gen. Plant.* ii. 715; leaves elliptic caudate-acuminate coriaceous, quite glabrous, nerves 9–11 pairs strong, follicles lanceolate from a contracted peduncle-like base. *Kurz For. Fl.* ii. 184. Chavannesia esculenta, *A. DC. Prodr.* viii. 444; *Strettell, note on Caoutchouc* (*Rangoon*, 1874, *with figure*). Echites? esculenta, *Wall. Cat.* 1671. E. lucida,? *Don Gen. Syst.* iv. 75.

MARTABAN and TAVOY; *Wallich.* Common all over PEGU (*Kurz*).

Branches and *leaves* quite glabrous. *Leaves* 4–6 by 2–2½ in., acute at both ends or obtuse at the base, shining above; nerves red, slightly arched. *Flowers* "minute, white; corymbs apparently short; long-peduncled, glabrous in the axils of the upper leaves, or terminal" (*Kurz*). *Follicles* 5 by ½ in., quite straight, pointed, narrowed into a stout stalk ½ in. long, thickly coriaceous when dry and hard. *Seeds* elliptic-lanceolate, villous, ½ in. long; coma white, four times as long.—The leaves a good deal resemble those of *U. brachysepala*, but are longer, and the nerves are more numerous. *Fruit* eatable.

SECT. II. **Dittormos.** *Follicles* flexuous, distantly torulose. *Calyx* shorter than the corolla; segments erect, subequal.

6. **U. torulosa,** *Hook. f.*; glabrous except the inflorescence, leaves oblong or oblong-lanceolate acuminate, nerves 6–10 pairs slender, cymes pubescent, follicles very slender swollen over the remote seeds.

MALACCA; *Maingay* (Kew Distrib. 1080, 1086).

Branches slender, smooth (in flower). *Leaves* 4–7 by 1½–2 in., red-brown when dry, thinly coriaceous. *Cymes* long-peduncled; bracts lanceolate; flowers not quite mature, ⅛ in. long. *Calyx-segments* oblong-lanceolate. *Corolla* as in the preceding section. *Anthers* subacute. *Ovary* hairy; style obconic, with a conoid stigma of the same length. *Follicles* 2–2½ ft. long, thinly coriaceous, smooth, terete, swellings ¾ in. long, often 1 in. apart, long ellipsoid. *Seeds* elliptic-lanceolate, villous, top bearded with persistent hairs; coma twice as long.—The follicles resemble those of *Parameria glandulifera.*

7. **U. brachysepala,** *Hook. f.*; glabrous except the puberulous flowers, leaves elliptic obtusely acuminate, nerves 6–8 pairs strong, cymes long-peduncled, peduncles and branches compressed, bracts subulate, sepals much shorter than the subglobose shortly 5-lobed corolla.

MALACCA; *Maingay* (Kew Distrib. 1079, 1080).

Branches rather stout; bark red-brown. *Leaves* 4–5 by 1½–2½ in., firmly coriaceous, red-brown when dry, nervules distinct on both surfaces. *Peduncles* 6–8 in., glabrous, red when dry, branches jointed at the nodes; branches and pedicels slender, glabrous; flowers very small, $\frac{1}{16}$–$\frac{1}{10}$ in. long. *Calyx-segments* erect, ovate. *Corolla* pubescent, inflated; lobes obtuse, glabrous within, except a tuft of hairs between the stamens. *Anthers* subacute. *Ovary* twice as long as the disc, cylindric, hirsute; style cupular, stigma large obpyriform. *Follicles* not seen.

DOUBTFUL SPECIES.

URCEOLA?; branches and leaves glabrous; bark black when dry; leaves 2–2½ by ¾–1¼ in., elliptic- or ovate-lanceolate obtusely acuminate, narrowed into the petiole, firmly coriaceous, pale brown shining above, nerves 3–4 pairs very slender ascending, follicles horizontal 6–8 by ¼ in. slightly curved cylindric from the base, narrowed at the apex, hard; seeds ⅓ in., very slender narrowed into a filiform process longer than the body, on which the fine pale brown hairs of the coma are placed. Probably an undescribed genus.—MALACCA; *Maingay* (Kew Distrib. 1069).

28. **PARAMERIA,** *Benth.*

Evergreen glabrous climbing shrubs. *Leaves* opposite, rarely 3-nately whorled. *Flowers* small, in broad lax terminal panicles. *Calyx* small, 5-fid or -partite, glandular within. *Corolla* sub-campanulate, throat broad naked, lobes obliquely obovate or obcuneate, wrinkled, overlapping to the left. *Stamens* at the base of the corolla, filaments short; anthers sagittate, acute or apiculate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* of 5 connate scales. *Carpels* 2, distinct, longer than the disc, many-ovuled; style short, top obconoid, stigma conoid. *Follicles* long, slender, distantly torulose.

Seeds linear or oblong, compressed, hairy, crowned with a deciduous pencil and persistent ring of hairs, albumen scanty; cotyledons thin, radicle superior, short.—DISTRIB. Species 2–3, Indian and Malayan.

1. **P. glandulifera,** *Benth. in Gen. Plant.* ii. 715; glabrous except the cymes, leaves coriaceous elliptic oblong or obovate obtuse acute or acuminate shining above, nerves 5–6 pairs arching very oblique, cymes in terminal and axillary brachiate panicles. *Kurz For. Fl.* ii. 189. Ecdysanthera glandulifera, *A. DC. Prodr.* viii. 443; *Wight Ic.* t. 1307 (E. Griffithii, *in text*). E. barbata, *Miq. Fl. Ind. Bat.* ii. 451. Echites glandulifera *and* monilifera, *Wall. Cat.* 1660, 1659; *G. Don Gen. Syst.* iv. 75. Parsonsia barbata, *Bl. Bijd.* 1042.

MARTABAN; *Wallich, Parish*; on the borders of tidal forests, *Kurz*. MALACCA; *Griffith, Maingay* (Kew Distrib. 1077, 1093). SINGAPORE; *Lobb.* ANDAMAN ISLDS.; *Kurz.*—DISTRIB. Java, Borneo, Philippine Islds., Cambodia.

Branches stout or slender. *Leaves* 3–5 by 1½–2 in., sometimes 3-nately whorled, smooth, nerves very slender; petiole very short, ⅙–⅛ in. Terminal panicle of *cymes* often 5–6 in. broad, pyramidal, axillary ones short; branches spreading, 3-chotomous, puberulous, pedicels short, or sometimes long and slender when the flowers are collected into globose umbellules; bracts minute; flowers ¼ in. diam. *Calyx-segments* small, ovate, one-quarter the length of the broad obtusely angled corolla-tube. *Corolla-lobes* about equalling the tube. *Anthers* acute and apiculate. *Ovary* somewhat hairy; style obconic. *Follicles* 6–12 in., very slender, flexuous, glabrous, pericarp thinly coriaceous; swellings over the seeds sometimes 1 in. apart, elliptic-lanceolate. *Seeds* ½ in. long, oblong-lanceolate, contracted at the tip, pubescent, coma three times as long, white. The follicles resemble those of *Urceola.*—Wight is mistaken in describing and figuring the overlapping of the corolla-lobes as to the right. Blume describes the axils of the nerves of the leaf and corolla-throat as bearded in *Parsonsia barbata*, characters which I do not observe in the Indian specimens.

2. **P. polyneura,** *Hook. f.*; glabrous except the cymes, leaves membranous elliptic-oblong or elliptic obtusely acuminate, nerves 8–10 pairs arching very oblique, cymes in terminal brachiate panicles.

TENASSERIM; *Lobb.* MALACCA; *Griffith, Maingay* (Kew Distrib. 1078).

Habit of *P. glandulifera*, but leaves very membranous with numerous nerves, cymes always terminal and anthers not apiculate. *Follicles* not seen.

29. BEAUMONTIA, *Wall.*

Evergreen climbing trees or shrubs. *Leaves* opposite, membranous; nerves distant, arched. *Flowers* very large, white, in terminal cymes; bracts leafy. *Calyx* 5-partite, glandular or not within. *Corolla-tube* very short, throat large, bell- or funnel-shaped, naked; lobes broad, overlapping to the right. *Stamens* at the top of the tube, included in the throat; filaments thickened at the top; anthers horny, sagittate, conniving over and adhering to the stigma; cells spurred at the base. *Disc* deeply 5-lobed. *Ovary* 2-celled, cells many-ovuled; style filiform, top clavate, stigma fusiform. *Fruit* long, thick, woody, at length dividing into 2 horizontally spreading follicles. *Seeds* compressed, ovoid or oblong, top contracted, crowned with a pencil of hairs; cotyledons thin or thick, radicle short superior.—DISTRIB. Species 4, Indian and Malayan.

1. **B. grandiflora,** *Wall. Tent. Fl. Nep.* 15, t. 7; *Cat.* 1629; leaves glabrous or tomentose beneath, calyx-lobes 1–2 in. long, corolla between tubular and bell-shaped much shorter than the tube. *A. DC. Prodr.* viii. 404; *Kurz For. Fl.* ii. 179; *Bot. Reg.* t. 911; *Bot. Mag.* t. 3213. ? B. longiflora, *Lodd. Bot. Cab.* 183. Echites grandiflora, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 14 (*excl. fruit*).

EASTERN HIMALAYA; from Nipal (*Wallich*) to Sikkim, ascending to 4000 ft. SILHET and CHITTAGONG.

Stem woody, very stout and climbing high. *Shoots* rusty-pubescent. *Leaves* 7–12 by 3–7 in., glabrous above, rarely tomentose beneath; obovate-oblong, abruptly acuminate; nerves 7–16 pairs, arching; petiole ½–1 in. *Cymes* few- or many-fld., pedicels and calyx tomentose. *Calyx-lobes* very variable, from oblong-lanceolate to obovate or oblanceolate, acuminate. *Corolla* 3–5 in. long, glabrous or pubescent; lobes 1 in. rounded, except the tip. *Anthers* ⅝ in. long. *Ripe carpels* very variable in length and breadth, turgid, densely fleshy, green, with a thick hard spongy yellowish polished endocarp. *Seeds* ⅝ in. long, coma twice as long.

2. **B. Jerdoniana,** *Wight Ic.* t. 1314, 5; leaves nearly glabrous beneath, calyx-lobes ¾–1 in. long, corolla between broadly campanulate and funnel-shaped, lobes acuminate, follicles 10 by 1½ in. cylindric.

DECCAN PENINSULA; on the Western Ghats from the Concan southwards, *Wight*, &c.

This so closely resembles *B. grandiflora* in all respects but the corolla, the rather smaller size of all its parts, and the form of the follicles, that I suspect it will have to be ranked as a variety.

3. **B. khasiana,** *Hook. f.*; leaves obovate or elliptic acuminate tomentose beneath, calyx-lobes ½ in., corolla broadly campanulate, lobes equalling the tube and throat rounded not acuminate.

KHASIA MTS.; Nungklow, *Lobb.*

The general habit of this is that of *B. grandiflora*, but the old leaves are broader, 8–10 by 4–4½ in., more elliptic, the peduncle and pedicels are much longer, and the flowers very short; the corolla-tube and throat are together not 2 in. long, whilst the limb is 4 in. in diameter, with quite rounded lobes. It is very near the Javanese *B. multiflora*, Teijsm & Binn., which is intermediate between this and *B. Jerdoniana*; all may be varieties of one, but without the fruit this cannot be determined.

30. CHONEMORPHA, *G. Don.*

Climbing stout shrubs. *Leaves* opposite, broad; nerves distant, arching. *Flowers* large, white, in lax terminal and pseudo-axillary cymes. *Calyx* 5-cleft or -partite, with a ring of glands within. *Corolla* salver-shaped, tube very short; throat long, tubular, naked; lobes broad, obliquely obcuneate, overlapping to the right, twisted sharply to the left. *Stamens* at the top of the tube, filaments short, broad, villous; anthers sagittate, elongate, pungent, conniving over and adhering to the stigma, cells shortly spurred below. *Disc* thick, annular or cupular. *Carpels* 2, distinct, many-ovuled; style filiform, base cleft, top globose or hemispheric, stigma conoid or subclavate. *Follicles* long, straight, hard, parallel, 3-gonous. *Seeds* ovoid or oblong, flat, shortly beaked, coma long, albumen thin; cotyledons oblong flat, radicle short.—DISTRIB. Species 2, Indian and Malayan.

1. **C. macrophylla,** *G. Don Gen. Syst.* iv. 76; calyx 5-lobed. *A. DC. Prodr.* viii. 430. *Wight Ic.* t. 432; *Brandis For. Fl.* 328; *Kurz For. Fl.* ii. 187. ? C. grandiflora, *G. Don l. c.* C. mollis, *Miquel Fl. Ind. Bat.* ii. 444, *ex Kurz in Journ. As. Soc.* 1877, ii. 257. Echites macrophylla, *Roxb. Fl. Ind.* ii. 13; *Wall. Cat.* 1657. E. grandis, *Wall. Cat.* 1658; *Grah. Cat. Bomb. Pl.* 113; *Dalz. & Gibs. Bomb. Fl.* 147. ? E. macrantha, *Spreng. Syst.* i. 632; *A. DC. l. c.* 477. Epichysianthus macrophyllus, *Voigt Hort. Suburb. Calc.* 523.—*Rheede Hort. Mal.* ix. t. 5, 6.

Moist forests throughout INDIA; from Kumaon in the HIMALAYA, ascending to 4500 ft., to Travancore, Ceylon, Malacca and the Andaman Islds.—DISTRIB. Java, Sumatra.

Branches glabrous, puberulous, or pubescent, soft, stout. *Leaves* 6–18 by 5–18 in., ovate elliptic obovate or orbicular, acute or cuspidate, base acute rounded or cordate, glabrous pubescent or tomentose beneath; nerves 10–12 pairs; petiole ½–2 in., stout or slender. *Cymes* on long or short stout pedicels; bracts ovate, acute. *Calyx* ⅓–½ in., coriaceous, terete, base truncate; lobes rounded or subacute. *Corolla* white, 2–3 in. diam., lobes ⅓–½ in. diam.; mouth glabrous, throat with 5 villous bands within. *Stamens* ½ in. *Follicles* 12–18 by ¾–1 in. *Seeds* ¾ in.

2. **C. Griffithii,** *Hook. f.*; calyx 5-partite.

SIKKIM HIMALAYA and KHASIA MTS., alt. 2–4000 ft., *Griffith*, &c.

Branches often hispid. *Leaves* smaller than in *C. macrophylla*. *Flowers* quite as large, but differing so much in the calyx as to suggest its belonging to a different genus. *Fruit* unknown.

DOUBTFUL SPECIES.

C. MALABARICA, *G. Don Gen. Syst.* iv. 76 (*excl. syn.* E. Pala). Echites malabarica, *Lamk. Dict.* ii. 342; *A. DC. Prodr.* viii. 477.—*Pal. Valer, Rheede Hort. Mal.* ix. t. 12.

C. VESTITA, *G. Don Gen. Syst.* iv. 76. Echites vestita, *Roem & Sch.* iv. 394; *A. DC. Prodr.* viii. 477. E. tomentosa, *Roth Nov. Sp.* 137, *non Vahl.*—This is possibly *Wrightia tomentosa.*

31. ECDYSANTHERA, *Hook. et Arn.*

Climbing glabrous shrubs. *Leaves* opposite, acuminate, nerves distant. *Flowers* minute, in terminal trichotomous panicled cymes. *Calyx* small, 5-partite, glandular or not within. *Corolla* subureeolate, throat naked, lobes very short, obtuse, overlapping to the right. *Stamens* at the base of the corolla; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* annular. *Carpels* 2, distinct, longer than the disc, many-ovuled, hairy; style short, top large cupular, stigma obpyriform. *Follicles* spreading, terete, acuminate. *Seeds* few, oblong or linear, compresssd, tip narrowed with a long coma and a short persistent ring of hairs, albumen scanty; cotyledons thin, radicle short superior.—DISTRIB. Species 4 or 5, Malayan and Chinese.

E. micrantha, *A. DC. Prodr.* viii. 442; leaves glabrous ovate-lanceolate obtusely acuminate, nerves 3–5 pairs, cymes long-peduncled glabrous or puberulous. E. brachiata, *A. DC. Prodr.* viii. 443; *Kurz For. Fl.* ii. 189. Echites ? micrantha *and* brachiata, *Wall. Cat.* 1667, 1668.

SIKKIM HIMALAYA (alt. 3–5000 ft.), ASSAM, SILHET, KHASIA MTS. (alt. 2–4000 ft.), CACHAR, AVA HILLS, *Kurz.*

A very tall climber; branches slender, pendulous, pustular, ultimate sometimes puberulous. *Leaves* 2–7 by 1–2 in., thinly coriaceous; nerves very oblique, slender; petiole ¼–½ in. *Cymes* brachiate; bracts minute; flowers $\frac{1}{36}$ to $\frac{1}{12}$ in. long; pedicels slender or short. *Calyx* not half the length of the corolla, segments ovate. *Corolla* glabrous within and without, lobes falcate, spreading. *Anthers* obtuse. *Follicles* 3–4 in., ¾ in. broad near the base, horizontal, slightly incurved, narrowed from above the base to the point, thickly coriaceous with a shining crustaceous endocarp. *Seeds* ¾ in. long, elliptic-lanceolate, compressed, pubescent, bearded at the constricted tip, coma three times as long.

32. BAISSEA, *A. DC.*

Climbing shrubs. *Leaves* opposite; nerves distant, straight. *Flowers* small, in dense or lax axillary or terminal panicled or corymbose cymes. *Calyx* small, 5-partite, glandular or not within; segments obtuse. *Corolla* salver-shaped, lobes overlapping to the right, not twisted (in the Indian species). *Stamens* below the middle of the corolla; anthers sagittate, conniving over the stigma and adhering to it, cells shortly spurred at the base. *Disc* cup-shaped. *Carpels* 2, distinct, sunk in the disc, many-ovuled; style short, top cup-shaped, stigma

columnar. *Follicles* long. *Seeds* long, linear, truncate or narrowed (not beaked) at both ends, glabrous, tipped with a deciduous coma, albumen not thick; cotyledons linear, flat, radicle short.—DISTRIB. Species 7, a Cingalese, a Malayan, and 5 African.

1. **B. acuminata,** *Benth. in Gen. Pl.* ii. 719; leaves oblong obtusely caudate-acuminate pale beneath glabrous, cymes terminal and axillary corymbose puberulous shorter or longer than the leaves. Cleghornia acuminata *and* cymosa, *Wight Ic.* t. 1310, 1312; *Walp. Ann.* iii. 43; *Thwaites Enum.* 194.

CEYLON; common in the central province, alt. 3000 ft.

A slender climber. *Leaves* 3–4 by 1–1½ in., rather thin; nerves quite horizontal, very slender; petiole ¼–⅓ in. *Cymes* trichotomous, peduncle slender; pedicels short. *Flowers* ¼ in. long. *Calyx* about half as long as the calyx-tube, glands between the sepals connate in pairs. *Corolla* glabrous or puberulous; lobes oblong or linear obtuse; tube and throat hairy within. *Follicles* 6–10 by ⅓ in., cylindric, smooth. *Seeds* 1¼ in., slender, narrowed at both ends.—The corolla-lobes are much too short and rounded in Wight's figure.

2. **B. malaccensis,** *Hook. f.*; leaves oblong or elliptic obtusely caudate-acuminate pale beneath glabrous, cymes terminal and axillary paniculate glabrous longer than the leaves.

MALACCA; *Maingay* (Kew Distrib. 1094).

Very closely allied to *B. acuminata*, but more slender, leaves smaller, 2 by ¾–1¼ in., more membranous, whiter beneath, cymes more panicled than corymbose; the flowers are almost identical, except that the glands are solitary between the sepals according to Maingay's mss. *Fruit* not seen.

33. AGANOSMA, *G. Don.*

Stout evergreen climbers. *Leaves* opposite. *Flowers* in terminal tomentose cymes, large or middle-sized. *Sepals* narrowly lanceolate, acuminate, with subulate glands at the base, rarely oblong ovate. *Corolla* salver-shaped, tube very short; throat long, cylindric, with bearded longitudinal bands behind the anthers; lobes lanceolate linear-oblong or broad and rounded, overlapping to the right and nearly straight in bud. *Stamens* at the base of the throat, included; anthers sagittate, rigid, conniving over the stigma and adnate to it, cells spurred at the base. *Disc* 5-lobed, cupular. *Carpels* 2, distinct, tips hirsute, rarely glabrous, many-ovuled; style short, top urn-shaped, truncate, stigma columnar. *Follicles* short or long, terete, straight or curved, linear. *Seeds* ovate or linear-oblong, flattened, glabrous, not beaked, albumen scanty; cotyledons oblong, radicle short.—DISTRIB. Species 5, Indian and Malayan.

The very different æstivation of the corolla requires the separation of this genus from *Ichnocarpus*.

SECT. I. **Amphineurion,** *A. DC.* *Sepals* ovate-oblong, acute. *Ovary* glabrous, half sunk in the disc. *Follicles* very long, cylindric.

1. **A. marginata,** *G. Don Gen. Syst.* iv. 77; glabrous or branches and leaves beneath pubescent, leaves oblong acute acuminate or caudate, nerves very strong beneath inarching within the margin, cymes lax, corolla glabrous, tube rather longer than the acute calyx-segments, lobes linear obtuse. *Wight Ic.* t. 425; *A. DC. Prodr.* viii. 433; *Kurz For. Fl.* ii. 186. A. acuminata, *G. Don. l. c.*; *Wight Ic.* t. 424; *A. DC. l. c.* 434. A. macrocarpa, *A. DC. l. c.* 434. Echites marginata, *Roxb. Fl. Ind.* ii. 15; *Wall. Cat.* 1661. E. acuminata, *Roxb. l. c.* E. macrocarpa, *Wall. Cat.* 1662. E. reticulata, *Boj. Hort. Maurit.*

211. E. apoxys, *Voigt Hort. Sub. Calc.* 522. ? E. cristata, *Roth Nov. Pl.* 135. ? Chonemorpha cristata, *G. Don l. c.* 76.

From SILHET and CHITTAGONG to MALACCA and SINGAPORE.—DISTRIB. Java, Sumatra, Philippine Islds.

A stout scandent or subscandent shrub. *Leaves* 2–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., coriaceous, hard, polished above, dark brown when dry; petiole $\frac{1}{4}$ in. *Cymes* chiefly axillary; peduncle slender, 1–2 in.; bracts deciduous; flowers white. *Corolla-tube* $\frac{1}{4}$–$\frac{1}{3}$ in., slender; lobes twice as long, mouth glabrous, throat not dilated. *Ovary* glabrous. *Follicles* 6–18 by $\frac{1}{3}$ in., straight or flexuous, cylindric. *Seeds* linear-oblong.

SECT. II. **Meiadenia,** *A. D.C.* *Calyx* large; lobes long, ovate or lanceolate. *Ovary* wholly included in the tubular 5-lobed disc.

2. **A. caryophyllata,** *G. Don Gen. Syst.* iv. 77; leaves ovate or elliptic acute obtuse or acuminate glabrous or tomentose beneath, nerves 3 pairs very oblique, cymes lax pubescent, sepals linear-lanceolate glandular within, corolla-lobes obliquely orbicular, ovary hairy at the tip, follicles 3–5 in.—*A. DC. Prodr.* viii. 432; *Dalz. & Gibs. Bomb. Fl.* 113; A. Blumei, *Wight Ic.* t. 1305, *not of A. DC.* Echites caryophyllata, *Wall. Cat.* 1651; *Bot. Mag.* t. 1919. ? E. Heynei, *Spreng. Syst.* i. 632. E. dichotoma, *Roth Nov. Pl.* 136. Chonemorpha dichotoma, *G. Don Gen. Syst.* iv. 76; *A. DC. l. c.* 477.

LOWER BENGAL; Monghir, *Hamilton*; common on rocks at Risikund, *Wallich.* DECCAN PENINSULA, *Heyne*, &c.

A large climber, stem very stout, shoots pubescent. *Leaves* 4–5 by 2–$2\frac{1}{2}$ in., coriaceous, base rounded acute or subcordate, nerves strong beneath and all running towards the point; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cymes* terminal, lax, white-tomentose; pedicels shorter than the calyx-lobes, which are hoary without. *Corolla-tube* and *throat* both cylindric, subequal; limb $1\frac{1}{2}$ in. diam. *Ovary* pubescent; style slender, top urceolate, stigma columnar, to the tip of which the anthers are attached. *Follicles* stout, nearly $\frac{1}{2}$ in. diam., pericarp thickly coriaceous. *Seeds* (unripe) ovate-oblong, $\frac{1}{2}$ in. long, flat.—I have retained Roxburgh's specific name for this plant, because it is that of his Herbarium, of Rottler's Herbarium, of the Botanical Magazine, of the Calcutta Botanic Gardens, and of DeCandolle's Prodromus; but it is not the *Echites caryophyllata* of Roxburgh's Flora, which is *A. calycina*, and is described as having subglobular cymes; nor of his drawing, repeated by Wight (Ic. t. 440), which agrees with his description and represents the leaves as having many spreading veins and ovate acute corolla-lobes and glabrous ovary. Nor have I quoted Rheede's figure (vii. t. 55) which is referred to as *E. caryophyllata* in the Botanical Magazine; nor Rheede's "Kemetti Valli" (ix. t. 14, not 135 as quoted by Roxburgh), which Roxburgh cites for his *caryophyllata*, as neither of these is a good representation of this or any other plant, and they both differ totally from Roxburgh's and the Bot. Mag. figure and description. Though evidently a commonly (cultivated?) plant in India, its only presumably native habitat is the Monghir one given above; its few red nerves and rounded corolla-lobes at once distinguish it from its congeners.

3. **A. gracilis,** *Hook. f.*; branches very slender, leaves elliptic oblong acuminate membranous glabrous, nerves 8–10 pairs, very slender arching, cymes terminal corymbose glabrate, peduncles and pedicels long slender, sepals $1\frac{1}{2}$ in. hoary eglandular, corolla-tube $\frac{3}{4}$ in., lobes $1\frac{1}{2}$ in. obliquely oblanceolate.

SIKKIM HIMALAYA, alt. 2–4000 ft.; *J. D. H.* KHASIA MTS., alt. 1–3000 ft.; *Lobb.*

A very beautiful and distinct species, at once distinguishable by the slender stem and branches, membranous leaves, few-flowered spreading glabrous cymes, very long sepals, and long narrow calyx-lobes.

4. **A. calycina,** *A. DC. Prodr.* viii. 432; branches stout, leaves elliptic or oblong-lanceolate acuminate glabrous, nerves 7–10 pairs arching slender, cymes terminal lax densely rusty-tomentose, peduncle and pedicels stout, sepals

$\frac{3}{4}$–1 in. eglandular, corolla-tube $\frac{1}{2}$ in., lobes ovate acute, ovary glabrous. *Kurz For. Fl.* ii. 186. A. Roxburghii, *G. Don ex Wight Ic.* t. 440. A. Wallichii, *G. Don Gen. Syst.* iv. 77. Echites calycina, *Wall. Cat.* 1653. E. caryophyllata, *Roxburgh Fl. Ind.* ii. 11 (*and drawings copied by Wight*, t. 440).

TAVOY; *Gomez, Kurz.*

Branches pubescent. *Leaves* 3–4 in., coriaceous; petiole $\frac{1}{3}$ in. *Cymes* many-fld., tomentose. *Sepals* very narrow, rusty tomentose. *Corolla-tube* hoary, slender, cylindric, base hardly dilated, narrowed upwards to the mouth, villous within. *Ovary* quite glabrous; style elongate-clavate, truncate, stigma columnar. *Fruit* unknown.—I have under *A. caryophyllata* stated my reasons for retaining that name for the plant of Roxburgh's Herbarium, and thus avoiding an involved synonymy and the necessity of giving it a new name.

5. **A. cymosa,** *G. Don Gen Syst.* iv. 77; glabrous or shoots and leaves beneath softly tomentose, leaves elliptic-oblong or oblong-lanceolate acute or finely acuminate, nerves 5–7 pairs, cymes dense rounded densely tomentose, sepals $\frac{1}{4}$–$\frac{1}{2}$ in., corolla-tube $\frac{1}{6}$–$\frac{1}{3}$ in., lobes $\frac{1}{4}$–$\frac{1}{3}$ in. ovate acuminate, ovary hirsute.

SILHET; *Roxburgh*, &c. DECCAN PENINSULA; common from Bombay to Travancore, *Heyne*, &c.

A stout rambling climber, very variable in size and habit, of which I am unable to distinguish the following forms specifically.

VAR. 1. *cymosa proper*; shoots tawny-tomentose, leaves 4–5 by 2–2$\frac{1}{2}$ in. elliptic or oblong abruptly acuminate glabrous or sparsely hairy above, pubescent or tomentose beneath, nerves 7–9 pairs, sepals $\frac{1}{3}$ in., corolla-lobes $\frac{1}{4}$ in. long.—A cymosa, *G. Don l. c.*; *A. DC. Prodr.* viii. 433. Echites cymosa, *Roxb. Fl. Ind.* ii. 16; *Wight Ic.* t. 395; *Wall. Cat.* 1654, *in part*.—Silhet.

VAR. 2. *lanceolata*; shoots tawny tomentose, leaves 4–5$\frac{1}{2}$ by 1–1$\frac{1}{2}$ in. oblong lanceolate finely acuminate margins and midrib beneath sparsely hairy, nerves 7–9 pairs, sepals $\frac{1}{2}$ in., corolla-lobes $\frac{1}{3}$ in. broad, follicles 3 by 3$\frac{1}{2}$ in. sessile linear-falcate, seeds ovate-lanceolate glabrous.—Echites cymosa, *Wall. Cat.* 1654, *in part* (specimens from Calcutta Botanic Gardens).

VAR. 3. *conferta*; shoots puberulous or hoary, leaves 2–3 by 1$\frac{1}{4}$–2 in. elliptic-oblong acute obtuse or apiculate rarely acuminate, quite glabrous on both surfaces, nerves 3–4 pairs, flowers as in var. 2. Echites conferta, *Wall. Cat.* 1655.—Deccan Peninsula, *Herb. Heyne.*

VAR. 4. *elegans*; shoots puberulous or glabrate, leaves 1$\frac{1}{2}$–2$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{2}$ acute obtuse or acuminate, nerves 3–5 pairs, sepals $\frac{1}{4}$–$\frac{1}{3}$ in., corolla-lobes $\frac{1}{6}$–$\frac{1}{4}$ in., "follicles 5–9 by $\frac{1}{4}$ in., terete, hairy at length glabrate, seeds linear-oblong shortly beaked glabrous" (*Thwaites*). Aganosma elegans, *G. Don l. c.*; *A. DC. Prodr.* viii. 433; *Wight Ic.* t. 1304; *Thwaites Enum.* 194. A. Doniana, *Wight Ic.* t. 1306 (a small-flowered form); *Dalz & Gibs. Bomb. Fl.* 146. Echites elegans, *Wall. Cat.* 1656. E. bracteata, *Herb. Heyne in Wall. Cat. under* 1656.—Deccan Peninsula and Ceylon.

DOUBTFUL SPECIES.

A. LÆVIGATA, *Grah. Cat. Bomb. Pl.* 113 (*Rheede Hort. Mal.* ix. t. 9); without description. S. Concan. Is probably *Parsonsia*.

34. **EPIGYNUM,** *Wight.*

Climbing shrubs. *Leaves* opposite, nerves distant, arching. *Flowers* hoary, in dense subcapitate corymbose or open paniculate cymes. *Calyx* small, 5-fid, lobes acute. *Corolla* salver-shaped, tube long, throat villous; lobes overlapping to the right, twisted to the left, or nearly erect. *Stamens* below the middle of the tube; anthers sagittate, acuminate, conniving around and hardly adhering to the stigma, cells spurred at the base. *Disc* lining the calyx-tube, fleshy, 5-lobed. *Carpels* 2, distinct, many-ovuled, dorsally adnate to the disc and surmounted by its 5 connivent lobes; style long or short, top obovate or cupular,

stigma thick. *Follicles* distinct, long, linear, terete. *Seeds* elongated, compressed (crowned with a wing or pencil of hairs?).—DISTRIB. Species 4 or 5, Malayan Peninsula and Borneo.

1. **E. Griffithianum,** *Wight Ic.* t. 1308; leaves elliptic acute at both ends glabrous, cymes rusty-pubescent, flowers ½ in. long, corolla pubescent, lobes in bud slightly twisted. *Kurz For. Fl.* ii. 184. Legouixia amabilis, *Muell. Argan. in Van Heurck Pl. Nov.* 146.

MERGUI; *Griffith, Kurz.*

Branches slender, puberulous towards the tips. *Leaves* 2–3 by ¾–1¼ in., membranous, brown when dry, narrowed into the short petiole. *Cymes* branched from the base or peduncled, 1–1½ in. diam.; branches ½ in.; flowers crowded; pedicels very short. *Calyx* ⅙ the length of the narrow corolla-tube. *Corolla-limb* ⅔ in. diam.; lobes obovate, glabrous within, throat and tube hairy within. *Fruit* not seen.

2. **E. Maingayi,** *Hook. f.*; leaves elliptic subacute and cymes softly tomentose beneath, flowers 1 in. long, corolla tomentose, lobes in bud nearly straight.

MALACCA; *Maingay* (Kew Distrib. 1088).

Branches slender, young tomentose. *Leaves* 3½–4½ by 1½–2 in., minutely puberulous above, with yellowish tomentum beneath; petiole ¼ in., tomentose. *Cymes* shortly peduncled; flowers very shortly pedicelled, corymbose. *Calyx* ⅛ the length of the corolla-tube. *Corolla-lobes* rounded, tomentose on one half of the back; tube and throat pubescent within and without. *Follicles* 6–8 by ¼–⅓ in., slender, cylindric, flexuous, tomentose. *Seeds* not ripe.

3. **? E. lævigatum,** *Hook. f.*; leaves elliptic-lanceolate acuminate quite glabrous, flowers ⅓ in. long, corolla glabrous, lobes strongly twisted in bud. Echites lævigata, *Wall. Cat.* 1669.

SILHET; at Pundua? (*Wallich*).

Perfectly glabrous throughout; branches slender, dark brown. *Leaves* 4–5 by 1½ in., thinly coriaceous, polished above; petiole ½ in. *Flowers* in peduncled axillary trichotomous panicled cymes, rather crowded towards the ends of the long horizontal branches; bracts ovate. *Calyx-lobes* ovate-lanceolate, with a small glandular tooth in the sinus between each lobe. *Corolla-tube* ⅙ in., twice as long as the calyx; lobes linear-oblong, twice as long as the tube. *Carpels* sunk in the cupular 5-lobed disc, and attached to it by their backs; style very short, stigma large. *Fruit* not seen.—A fruiting specimen of what may be this species was collected in Cachar by Keenan; the follicles are 3–4 in. by ¼ in., horizontal, terete, gradually narrowed from the base to the acute point, exactly as in *Anodendron*, but the seeds are slender and not beaked.

DOUBTFUL SPECIES.

? E. PARVIFLORUM, *Hook. f.*; quite glabrous, leaves 5–6 by 1½–2 in., elliptic-lanceolate, acuminate at both ends, nerves 5–6 pairs very oblique, petiole ½ in., flowers in lax brachiate axillary and terminal cymes, peduncle branches and pedicels slender, calyx very small, corolla pale yellow, tube short, limb ½ in. diam., lobes falcately lanceolate acuminate, stamens towards the base of the tube, ovary sunk in the 5-lobed disc, style very short, top cup-shaped, stigma conical. Echites parviflora, *Roxb. Fl. Ind.* ii. 20.

NORTHERN CIRCARS; *Roxburgh.*

I have described this from Roxburgh's drawings; it appears closely allied to *E.? lævigatum.*

35. RHYNCHODIA, *Benth.*

A lofty climbing evergreen shrub. *Leaves* opposite, broad, membranous, nerves distant. *Flowers* in lax broad axillary or subterminal panicled cymes.

Calyx 5-partite or -fid, glandular within. *Corolla* salver-shaped, throat contracted, villous; lobes large, broad, obliquely obcuneate, overlapping to the right, twisted to the left. *Stamens* in the middle of the tube, filaments broad short; anthers sagittate, conniving round and adhering to the stigma, cells shortly spurred below. *Disc* annular, 5-fid. *Carpels* 2, distinct, glabrous, longer than the disc, many-ovuled; style filiform, top clavate truncate, stigma columnar. *Follicles* elongate, narrow, compressed. *Seeds* ovate or oblong, compressed, beak slender, tipped by a deciduous coma.

R. Wallichii, *Benth. in Gen. Pl.* ii. 720; glabrous, leaves elliptic ovate or oblong cuspidate or caudate-acuminate, cymes dichotomous loose, peduncles and pedicels slender. Rhynchospermum Wallichii *and* R. ellipticum, *A. DC. Prodr.* viii. 431. Echites rhynchosperma, *Wall. Pl. As. Rar.* i. 43, t. 49; *Cat.* 1665. E. elliptica, *Wall. Cat.* 1666. Echites verticalis, *Herb. Ham.* Cercocoma Wallichii, *Miq. Fl. Ind. Bat.* ii. 445; *Kurz For. Fl.* ii. 187.

SIKKIM HIMALAYA, alt. 2500 ft.; *Treutler.* SILHET; *De Silva.* ASSAM; *Masters.* CACHAR; *Keenan.* MARTABAN, TENASSERIM and AVA; *Wallich, Kurz.*

Branches distantly tubercled. *Leaves* 5–9 by 2–4 in., base acute, rounded or rarely cordate; petiole slender, 1 in. *Cymes* 2–4 in. diam.; flowers white, fragrant; peduncle 1–3 in. *Calyx-lobes* ovate-lanceolate, half as long as the corolla-tube. *Corolla* glabrous, except round the mouth; tube $\frac{1}{4}$ in., 5-angled; limb 1 in. diam.; lobes narrowly obovate. *Follicles* 12–18 by $\frac{1}{2}$–$\frac{3}{4}$ in., smooth. *Seeds* 1 in., beak as long as the body, hairs rather longer, white.—This genus might well form a section of *Trachelospermum.*

36. TRACHELOSPERMUM, *Lemaire.*

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* white or purplish, in lax terminal or pseudo-axillary cymes. *Calyx* small, 5-partite, glandular or scaly within. *Corolla* salver-shaped, mouth constricted; lobes oblique, overlapping to the right, twisted to the left. *Stamens* above the middle of the tube, tips included or exserted, filaments short, broad; anthers conniving over and adhering to the stigma, cells spurred at the base. *Disc* annular or of oblong glands. *Carpels* 2, distinct, many-ovuled; style short, top cupular, stigma columnar. *Follicles* elongate, slender, incurved, terete. *Seeds* linear, not beaked, coma long, albumen copious; cotyledons linear, flat, radicle short.—DISTRIB. Species 8, East Asiatic and Malayan.

* *Cymes in the upper axils, long-peduncled. Corolla-tube slender, much longer than the calyx.*

1. **T. fragrans,** *Hook. f.*; leaves elliptic-lanceolate obtusely acuminate, cymes loosely panicled, peduncles and pedicels slender, sepals ovate or lanceolate, corolla-lobes at base and mouth pubescent, anthers included. Ichnocarpus fragrans, *Wall. Cat.* 1675; *A. DC. Prodr.* viii. 435; *Brand. For. Fl.* 327. I. ? inflata, *Herb. Ham. in Wall. l.c.* Blaberopus lucidus, *A. DC. l.c.* 411. Alstonia lucida, *Don Prodr.* 231.

TEMPERATE and SUBTROPICAL HIMALAYA; from Kumaon, ascending to 5,700 ft. to Bhotan, exclusive of Sikkim. ASSAM; Muku hills, *Simonds.* CACHAR; *Keenan.*

A tall climber, shoots and petioles sometimes pubescent. *Leaves* 3–5 by 1–1$\frac{1}{2}$ in.; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Peduncles* 1–3 in., very slender, stout, angular, trichotomously branched. *Sepals* $\frac{1}{4}$–$\frac{1}{2}$ the length of the corolla-tube. *Corolla* white, tube slender, with the throat $\frac{1}{3}$–$\frac{1}{2}$ in.; lobes obcuneate, obliquely truncate. *Disc-glands* quadrate. *Ovary* glabrous, acute. *Follicles* 4–9 by $\frac{1}{4}$ in., incurved and converging, cylindric, acuminate, narrowed at the base; pericarp thinly coriaceous, smooth, pale. *Seeds*

$\frac{3}{4}$ in. long, slender, compressed, obtuse at both ends, pale, smooth, coma as long, white.

2. **T. gracilipes,** *Hook. f.*; glabrous, leaves elliptic acute, cymes loosely panicled, peduncle and pedicels capillary, calyx-segments ovate or lanceolate, corolla-lobes and throat glabrous, anther-tips exserted.

KHASIA and JYNTEA MTS.; *Lobb.* ASSAM; Gowahatty, *Simons.*

Very similar to *T. fragrans*, but differing in the form of the leaf point, in the more slender cymes, and notably in the glabrous corolla and exserted anther-tips.

** *Cymes short-peduncled, in numerous axils. Corolla-tube short.*

3. **T. axillare,** *Hook. f.*; quite glabrous, leaves oblanceolate obovate or elliptic-oblong abruptly caudate-acuminate, cymes very shortly peduncled, sepals rounded, shorter than the glabrous corolla. Rhynchospermum 5, *Herb. Ind. Or. Hook. f. & T.*

SIKKIM HIMALAYA; alt. 4–6000 ft., *J. D. H.*

A stout arboreous climber. *Leaves* 3–5 by 1–1½ in., rather coriaceous, tip ½ in. long. *Cymes* 1 in. diam.; peduncle ¼ in., pedicels rather longer, stout. *Sepals* puberulous, half the length of the corolla-tube. *Corolla* dull purple; tube angular, ⅙ in. long; lobes linear-oblong, nearly straight, obtuse; mouth and throat glabrous. *Stamens* included. *Glands* glabrous. *Ovary* pubescent; style very short, stout. *Follicles* 6–8 by ½ in., curved, cylindric, tomentose. *Seeds* slender, ¾ in. long; coma 2 in., copious, pale brown.—*Buds* more obtuse and lobes less twisted to the left than in the typical species.

37. ANODENDRON, *A. DC.*

Climbing glabrous shrubs. *Leaves* opposite, nerves distant arched. *Flowers* in axillary or axillary and terminal slender panicled wide spreading cymes. *Calyx* 5-cleft; segments obtuse, eglandular within. *Corolla* salver-shaped, mouth contracted; lobes narrow, overlapping to the right, twisted to the left. *Stamens* below the middle of the tube; anthers sagittate, conniving round and adherent to the stigma, cells shortly spurred at the base. *Disc* cupular. *Carpels* 2, distinct, sunk in the disc, and attached to it by their backs at the base, many-ovuled; style very short, top cupular, stigma thick conic. *Follicles* diverging, acuminate, hard. *Seeds* ovoid or oblong, compressed, beaked, tipped with a long coma.—DISTRIB. Species 7, Asiatic and Malayan.

1. **A. paniculatum,** *A. DC. Prodr.* viii. 444; quite glabrous, leaves large elliptic or oblong obtusely cuspidate thinly coriaceous, nerves 12–15 pairs, calyx-lobes obtuse. *Dalz. & Gibs. Bomb. Fl.* 147; *Thwaites Enum.* 194; *Kurz For. Fl.* ii. 188; *Wight Ic.* t. 1309, *fruit and seeds only.* Echites paniculata, *Roxb. Fl. Ind.* ii. 17; *Wight Ic.* t. 396. E. coriacea, *Wall. Cat.* 1586. E. manubriata *and* polyantha, *Wall. Cat.* 1663, 1664. Gymnema nepalense, ? *Grah. Cat. Bomb. Pl.* 120 (*ex Dalz. & Gibs.*).—*Rheede Hort. Mal.* ix. t. 8.

From SILHET to MARTABAN. DECCAN PENINSULA; on the Western Ghats from the Concan southwards. CEYLON; common up to 2000 ft.—DISTRIB. Java, Timor, Philippine Islds.

An immense climber. *Leaves* 4–8 by 1½–3 in.; petiole ½ in. *Cymes* 2–10 in. long and broad, repeatedly 3-chotomously branched; branches brachiate, filiform; flowers 3-nate; pedicels short; bracts ovate. *Calyx-lobes* minute. *Corolla* ⅛ in. long, yellowish white, lobes twice as long as the tube, narrow, falcate, obtuse, throat villous. *Stigma* subsessile. *Follicles* 5–6 in., straight, narrowed from a base ¾ in. diam. to the obtuse point, terete, woody. *Seeds* few, 1¼ in. long, flat; beak long slender; coma white, 2 in. long.

2. **A. Candolleanum,** *Wight Ic.* t. 1309 (*excl. fruit and seeds*); quite glabrous, leaves elliptic obtusely cuspidate thickly coriaceous, nerves 8–10 pairs, petiole 1 in., calyx-lobes acute. *Miquel Fl. Ind. Bat.* ii. 455. A. rubescens, *Teijsm. & Binnend. Cat. Hort. Bogor.*

MALACCA; *Capt. Wight, Maingay* (Kew Distrib. 1087).—DISTRIB. Borneo.

Very similar in inflorescence and flowers to *A. paniculatum,* but petioles longer, leaves very different in texture, sepals acute, corolla-throat nearly glabrous, style distinct, stigma smaller, follicles much thinner-walled, acute, and seeds (unripe) apparently much more slender,

3. **A. rhinosporum,** *Thwaites Enum.* 195; quite glabrous, leaves coriaceous elliptic-oblong or -lanceolate obtuse or obtusely acuminate, nerves very slender, petiole $\frac{1}{3}$ in., flowers $\frac{1}{10}$ in. long.

CEYLON; Ambagamowa and Matuvatte districts, *Thwaites.*

A much smaller and narrower-leaved plant than either of the foregoing, with a smaller panicle. *Leaves* 2–4 by $\frac{1}{2}$–$1\frac{1}{2}$ in.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Follicles* 3–5 in. *Seeds* 1 in.

4. **A. pauciflorum,** *Hook. f.*; quite glabrous, leaves oblong or oblong-lanceolate obtusely acuminate, nerves very slender, cymes small short axillary puberulous few-fld., flower $\frac{1}{2}$ in. long.

PENANG; *Maingay* (Kew Distrib. 1101).

Branches smooth, glabrous. *Leaves* 4–5 by $1\frac{1}{2}$–2 in., red-brown when dry; nerves 8–10 pairs, slightly arched, very slender; petiole $\frac{1}{3}$ in., stout. *Cymes* much shorter than the leaves; peduncle stout, $\frac{1}{2}$–1 in.; bracts ovate, crowded; pedicels very short. *Calyx-lobes* obtuse. *Corolla* glabrous, lobes acute in bud, strongly twisted; tube about equalling the linear-lanceolate falcate obtuse lobes; throat pubescent. *Style* and stigma together pyriform, seated on the glabrous carpels. *Follicles* 4–5 by $\frac{3}{4}$–1 in., horizontal, straight, tapering from a rounded base to the subacute points, terete, smooth, pericarp thick. *Seeds* $\frac{2}{3}$ in. long, ovoid, beaked, flat, glabrous; coma three times as long, brown.

38. ICHNOCARPUS, *Br.*

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* small or minute, in long terminal and axillary paniculate cymes. *Calyx* 5-fid, glandular or not within. *Corolla* salver-shaped, throat contracted or villous; lobes narrowed to the obtuse point, overlapping to the right, upper half deflexed in bud. *Stamens* at or below the middle of the tube; anthers sagittate, conniving over and adhering to the stigma, cells spurred at the base. *Disc* free, 5-lobed. *Carpels* 2, distinct, exserted from the disc, many-ovuled, hairy; style short, top obconic, stigma columnar. *Follicles* spreading or divaricate, slender and subterete or rigid and compressed. *Seeds* narrowed at the tip, coma deciduous, albumen copious; cotyledons long, flat, radicle short, superior.—DISTRIB. Species 5 or 6, Indian, Malayan and Australian.

1. **I. frutescens,** *Br. in Hort. Kew. ed.* 2, ii. 69; glabrous or branches and leaves beneath more or less softly tomentose, leaves elliptic oblong or lanceolate acute, cymes pubescent, corolla-tube glabrous, mouth villous. *Benth. Fl. Austral.* iv. 315; *Wight Ic.* t. 430; *Wall. Cat.* 1674; *Brand. For. Fl.* 327; *Grah. Cat. Bomb. Pl.* 113; *Dalz. & Gibs. Bomb. Fl.* 147; *Kurz For. Fl.* ii. 185. I. radicans, *Wall. Cat.* 1676. I. dasycalyx, *Miquel Fl. Ind. Bat.* ii. 449. I. leptodictyus, *F. Muell. Fragmenta,* vi. 118. Echites frutescens, *Wall. Cat.* 1674. Apocynum frutescens, *Linn.*—Lyama, *Roxb. in As. Res.* i. 261.—*Burm. Fl. Zeyl.* 23, t. 12, fig. 1.

WESTERN HIMALAYA; Sirmore to Nepal, alt. 1–2000 ft. UPPER GANGETIC PLAIN; from Delhi to BENGAL, ASSAM, SILHET, CHITTAGONG, BIRMA, the DECCAN PENINSULA and CEYLON.—DISTRIB. Java, Australia.

An extensive climber. *Leaves* very variable, 2–3 by $\frac{3}{4}$–1$\frac{1}{2}$ in.; petiole $\frac{1}{4}$ in. *Cymes* 1–3 in., axillary and in terminal panicles, rusty-pubescent; branches short, trichotomously divided or 3-flowered; pedicels longer or shorter than the corolla. *Calyx-lobes* ovate, obtuse or subacute, eglandular. *Corolla* about $\frac{1}{4}$ in. diam., purplish, twice as long as the calyx; lobes twice as long as the tube, falcate, acuminate, mouth and margins sparingly bearded. *Disc-glands* 5, erect, slender, capitate, much longer than the hairy ovary. *Style* very short. *Follicles* 3–6 by $\frac{1}{6}$ in., very slender, cylindric, curved, acute, "sometimes moniliform as in *Ecdysanthera*," *Kurz*, divergent at an acute angle; pericarp thinly coriaceous. *Seeds* $\frac{1}{2}$ in., very slender, not beaked; coma as long, scanty, white.—*I. radicans*, Wall., is the young state of the plant.

VAR. *parvifolia*; leaves 1–1$\frac{1}{2}$ by $\frac{1}{3}$ in. oblong or linear-oblong, cymes shorter.—Coimbatore, *Wight*, &c.

2. **I. ovatifolius,** *A. DC. Prodr.* viii. 435; glabrous or branches and leaves beneath more or less tomentose, leaves orbicular elliptic-oblong or ovate obtuse acute or cuspidate, peduncle and pedicels pubescent, corolla-tube pubescent, mouth puberulous. I. affinis, *Herb. Ind. Or. H. f. & T.* Echites affinis, *Roem. & Sch.* I. latifolia, *Herb. Ham. in Wall. Cat.* 1652. Springia indica, *Muell. & Van Heurck in Plant. Nov. Van Heurck,* 143.

SILHET and KHASIA MTS.; alt. 1–4000 ft. MALACCA; *Griffith*, *Maingay* (Kew Distrib. 1075, 1103).—DISTRIB. Sumatra, Borneo, Celebes, Philippine Islds.

Very closely allied to *I. frutescens*, and perhaps a variety of that plant, but besides the characters indicated the leaves are much larger and broader, and the disc-glands are not capitate.—The flowers occur in a monstrous state (through insect-puncture), the corolla being enlarged below into a globose form $\frac{1}{2}$ in. diam., crowned with a rigid erect tubular beak. This state occurs in Wallich's Herbarium, under No. 2015, from Tavoy (which number should apply to a *Dendrobium*), and it is Maingay's 1103 (Kew Distrib.) from Malacca.

3. **I. pubiflorus,** *Hook. f.*; glabrous, with rusty-tomentose cymes, leaves elliptic obtusely acuminate, cymes very shortly peduncled dense-flowered, calyx-segments oblong equalling the glabrous corolla-tube, corolla-throat pubescent, lobes linear-oblong, base gibbous.

KHASIA MTS.; *Griffith* (a solitary specimen).

Branch stout, glabrous, bark dark brown. *Leaves* 3 by 1$\frac{1}{2}$ in., rather coriaceous; petiole $\frac{1}{3}$ in. *Cymes* $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad, branched from near the base, peduncle pedicels and bracts densely tomentose; flowers $\frac{1}{4}$ in. long, corolla as broad. *Calyx* cleft to the base into linear-oblong segments. *Corolla-tube* short; lobes obliquely ovate, obtuse. *Anthers* acuminate. *Ovary* villous above, glabrous below.

39. MICROCHITES, *Miquel.*

Climbing shrubs. *Leaves* opposite, nerves distant. *Flowers* very small, in axillary and terminal lax thyrsoid or brachiate panicled cymes. *Calyx* small, 5-fid or -partite, glandular within, segments obtuse. *Corolla* campanulate or salver-shaped, tube short; lobes falcate, overlapping to the right, very oblique, upper half deflexed in bud. *Stamens* near the bottom of the tube, filaments short; anthers sagittate, conniving around and adhering to the stigma, cells spurred at the base. *Disc* annular or cupular, entire or lobed. *Carpels* 2, longer than the disc, distinct, many-ovuled, hirsute; style short, top turbinate or globose, stigma clavate. *Follicles* spreading or recurved, hard, subterete. *Seeds* oblong, compressed, not beaked; coma terminal, caducous.—DISTRIB. Species 4, Malayan.

1. **M. polyantha,** *Miq. Fl. Ind. Bat.* ii. 456; leaves ellliptic oblong or oblong-lanceolate obtuse or obtusely acuminate glabrous, nerves numerous very slender nearly straight, cymes puberulous short axillary and in terminal racemes, flowers $\frac{1}{8}$ in. long, corolla subcampanulate glabrous. Tabernæmontana polyantha, *Blume Bijd.* 1029; *A. DC. Prodr.* viii. 376.

MALACCA; *Maingay* (Kew Distrib. 1081). ANDAMAN ISLDS.; *Kurz.*—DISTRIB. Java.

Branches slender, obscurely angled. *Leaves* 2–3 by 1–1$\frac{1}{2}$ in., narrowed at both ends; nerves 10–15 pairs, with intermediate still more slender ones, very spreading, but not horizontal; petiole $\frac{1}{2}$ in. *Cymes* very shortly peduncled, about $\frac{1}{2}$ in. diam., few-fld.; bracts minute; pedicels short, stout, and calyx densely pubescent; flowers $\frac{1}{8}$ in. long. *Calyx-lobes* round. *Corolla* glabrous, subcampanulate, lobes about equalling the throat, falcately lanceolate, very oblique, mouth bearded. *Anthers* acute. *Ovary* much longer than the disc, hirsute; style short, stigma conical.

2. **M. elliptica,** *Hook. f.*; leaves elliptic- or oblong-lanceolate obtusely or acutely acuminate, nerves numerous very slender nearly straight, cymes elongate glabrate, flowers $\frac{1}{6}$ in. long, corolla salver-shaped. Rhynchospermum 4, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; alt. 4–6000 ft., *J. D. H.* KHASIA MTS.; *Griffith*, alt. 3–4000 ft., *H. f. & T.*

Very similar to *M. polyantha*, but leaves narrower, 4–6 by 1–1$\frac{3}{4}$ in., more acuminate, cymes usually longer, with distant short branches, flower larger, corolla more salver-shaped, the lobes more obliquely falcate, upper deflexed half narrow obtuse; style longer, its top more globose. *Follicles* (unripe) red, 5–6 by $\frac{1}{2}$ in, horizontal or recurved, subcylindric, broadest at the base, gradually narrowed thence to the point, pericarp hard and fleshy. *Seeds* very immature, $\frac{1}{3}$ in. long, narrowly oblong, glabrous; coma long.—The branches sometimes root copiously.

ADDENDA AND ERRATA, VOL. III., PART III.

P. 5. *Viburnum sambucinum* is a Javanese, not a Japanese plant.

P. 221. Subtribe V. CONYZEÆ. The ray-flowers are white or yellow.

P. 232. Under *D. Roylei*, for *Fullaronia* read *Fullartonia.*

P. 244. Under *E. longicaule*, for *Milkania* read *Mikania.*

P. 256. In generic character of *Microglossa*, *for* ligule "minute, white" *read* minute or small, white or lilac.

P. 257. Under *M. albescens*, line 4, *after* corymb *insert* "ligule lilac slender."

P. 260. BLUMEA. Since the printing of this genus Mr. Clarke has visited the Candollean Herbarium in Geneva, and communicated to me the following notes on such of the species described in De Candolle's Prodromus as appeared to him (without having the Wallichian Collection to compare) not to accord, wholly or in part, with the descriptions in this Flora. In respect of these discrepancies large allowance must be made for the fact that, in so critical a genus, the specimens sent by Wallich to DeCandolle do often differ considerably from those at the Linnean Society. The numbers are those of the Prodromus, vol. v. p. 433, &c.

3. *B. tenella.* Prodr. p. 433. The Timor plant is quite unlike any Indian one; the Madras one may be referable to *B. bifoliata.*

5. *B. anagallidifolia*, Prodr. p. 433. Is rather *B. amplectens* than *bifoliata*, the leaves being nearly entire.

11. *B. Chamissoniana*, Prodr. p. 434, from Luzon; and 17. *B. Leschenaultiana*, p. 435, are typical *B. Wightiana.*

18. *B. lactucæfolia*, Prodr. p. 435. The Birman plant is *B. lacera*; the Luzon one *B. laciniata*.

20. *B. lacera*, var. *Wallichii*, p. 435, consists of *B. lacera*, *Wightiana*, *glomerata*, and an *Erigeron*.

28. *B. cichoriifolia*, Prodr. p. 437, and *B. crepidifolia l. c.* (B. laciniata, *Ham. in Wall. Cat.* 3084), are both *B. laciniata*.

39. *B. senecioides*, Prodr. p. 439 (Conyza senecioides, *Ham. in Wall. Cat.* 3102), is a form of *B. membranacea* resembling *B. virens*, but with more viscous bracts; it is the same as *B. hymenophylla*.

47. *B. membranacea*, Prodr. p. 440; and 51. *B. cuneifolia*, p. 441 (*Conyza cuneifolia*, Wall. Cat. 3101, from Martaban), are probably *B. lacera*.

48. *B. viscosula*, Prodr. p. 441, and *B. hispidula*, are the same as *B. paucifolia*, as is probably *B. subsimplex*, and all referable to vars. of *membranacea*.

56. *B. holoserica*, Prodr. 442, and *B. gracilis*, 443, are forms of *lacera*.

58. *B. fasciculata*, Prodr. p. 442. The Birman plant is *B. glomerata*, the Timor one quite different.

65. *B. spinellosa*, Prodr. p. 443, is a silky straggling form of *B. hieraciifolia*.

75. *B. elongata*, Prodr. p. 445, consists of *B. Clarkei*, and the large form of *lacera*?.

81. *B. longifolia*, Prodr. p. 446, may be *B. myriocephala*.

P. 482. PRIMULA. All the species here for the first time described will be found together with figures of them in a paper by Dr. Watt, shortly to be published in the Journal of the Linnean Society, vol. xx. p. 1 (ined.), together with the following, which should follow 35. *P. uniflora*, p. 493.

P. WATTII, *King in Herb. Calcutt.*; glabrous, leaves oblong-lanceolate narrowed into the petiole obtuse lobulate or crenate softly hairy, scape slender 6–8-fld., bracts narrow or rounded, flowers capitate, calyx large lax cupular membranous irregularly incised, corolla violet, limbs broadly infundibular, lobes crenate.

SIKKIM HIMALAYA; Chola, Natong, *Dr. King*.

Rootstock small. *Leaves* 2–4 in., membranous. *Heads* 1–2 in. diam. *Calyx* ½ in., veined. *Corolla-tube* ½ in., glabrous; limb twice as long and broad. *Stamens* at the mouth of the tube. *Ovary* globose, top rounded; style very short, stigma truncate.—A very beautiful plant.

P. 495. ANDROSACE. This genus also has been illustrated by Dr. Watt for the Journal of the Linnean Society, l. c. p. 16 (ined.), where the following additional species is described: it should follow 8. *A. geraniifolia*, p. 497.

A. CROFTII, *Watt in Journ. Linn. Soc. ined*; small, perennial, stoloniferous, densely rufous tomentose, leaves petioled reniform-rounded crenate or lobulate lobules 1–3-crenulate, scape stout few-fld. equalling the leaves, flowers umbellate, bracts lanceolate obtuse, pedicels short, calyx-lobes obtuse, corolla small lobes obovate retuse.

SIKKIM HIMALAYA; Singalelah, alt. 12–13,000 ft., *Watt*.

Whole plant clothed with (when dry) rufous hairs. *Rootstock* short, creeping. *Leaves* 1–1½ in. long with the petiole; blade ⅓–½ in. diam., hairy on both surfaces. *Flowers* ⅛ in. diam., apparently purple.

P. 542, line 6, *after* acuminata *add* Lindl.; and *for* 260 *read* 268.

P. 546, *for* B. Mottleyana, *De Vriese*, *read* B. Motleyana, *Clarke*; and add at end of specific character, Isonandra Motleyana, *De Vriese in Miq. Journ.* 1861, 257.

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